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## New black fungus gnats (Diptera: Sciaridae) from Eastern Australia

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### Abstract

The following 17 species are described as new for science: *Austrosciara heterospinata* sp. n., *Aus. kalliesi* sp. n., *Aus. multispinulata* sp. n., *Aus. stockerae* sp. n., *Aus. trichovenosa* sp. n., *Bradysia chloroantennata* sp. n., *B. fuscovirgata* sp. n., *B. loudoni* sp. n., *B. macrotrichata* sp. n., *B. nigroantennata* sp. n., *B. parareflexa* sp. n., *Cratyna (Peyerimhoffia) subvagabunda* sp. n., *Euricrium (Austroeuricrium) australiensis* sp. n., *Phytosciara crocera* sp. n., *Pseudolycoriella latostylata* sp. n., *Psl. rubroalata* sp. n., and *Scatopsciara nigrothoracica* sp. n. The following 4 species are new records for Australia: *B. aspercera* Mohrig, *B. centidens* Vilkamaa, Hippa & Mohrig (both from Papua New Guinea), *B. gibbosa* Vilkamaa, Hippa & Mohrig and *Pseudolycoriella capillosa* Vilkamaa, Hippa & Mohrig (both from New Caledonia). *Euricrium australiensis* sp. n. is the type species of the subgenus *Austroeuricrium* subgen. n. First detections of the species *B. conjuncta* (Skuse), *B. exsequialis* (Skuse), *B. pernitida* (Skuse) and *B. pictipes* (Skuse) were made after their description in the 19<sup>th</sup> century. One species was declared as a new synonym: *B. centidens* Vilkamaa, Hippa & Mohrig, 2012 = *B. mutuata* Mohrig, 2016 syn. n. Five species were excluded from the subgenus *Peyerimhoffia*. Four are newly combined in the genus *Corynoptera*, *crassistylata* group [*C. sparsula* (Shi & Huang) comb. n., *C. brachypoda* (Shi & Huang) comb. n., *C. yunnana* (Shi & Huang) comb. n., *C. shennongiana* (Shi & Huang) comb. n.], one in *Corynoptera* s. str. [*C. longiprojecta* (Shi & Huang) comb. n.]. *Corynoptera longiprojecta* (Shi & Huang) is a junior synonym of *Corynoptera diversicalcaria* Mohrig, 2004 from Papua New Guinea.

**Key words:** *Austroeuricrium* subgen. n., *Austrosciara*, *Bradysia*, *Corynoptera*, *Cratyna*, *Euricrium*, *Peyerimhoffia*, *Phytosciara*, *Pseudolycoriella*, *Scatopsciara*, new combinations, new species, new subgenus, new synonyms

### Introduction

The sciarid fauna of Australia is generally rather poorly known, except for some cosmopolitan pest species associated with greenhouses and mushroom farms (Loudon 1978; Broadley *et al.* 2018), and a few species described in early papers by Skuse (1888, 1890) and Schmitz & Mjöberg (1924). The revision of the male type species of Skuse by Broadley *et al.* (2016) laid the groundwork for a modern taxonomic study of the Australian fauna. The first regional faunistic studies were subsequently completed for Queensland (Mohrig *et al.* 2017a; 2017b) and further manuscripts are in preparation.

Here we describe undetermined specimens mostly obtained from a rather large slide collection held by the New South Wales Department of Primary Industries, sampled between 1960 and 1985 by B.J. Loudon and colleagues.

### Material and methods

The embedding material used on the slides is an artificial resin, most likely Euparal, which has shrunken over time

causing many of the specimens to become strongly depressed and deformed, which has prevented exact determination. Some specimens, however, were less deformed and represent zoogeographically very interesting species, which we decided to describe herein. Some additional specimens collected by A. Kallies (Germany), A. Broadley (Australia) and J. Lumbers (Australia) using sweep nets, yellow pans and malaise traps have also been included.

Embedding procedures and the illustration technique were described in detail by Mohrig *et al.* (2017a).

The terminology used herein follows Mohrig & Menzel (2009) and Mohrig *et al.* (2013); morphological structures follow those illustrated and explained in Broadley *et al.* (2016).

**Abbreviations:** l/w-index = length/width of the 4<sup>th</sup> flagellomere; c/w = ratio of C and w within the space between R<sub>s</sub> and M<sub>1</sub>; x/y = wing vein bM/wing vein r-m.

## Museums and collections

ANIC	Australian National Insect Collection, CSIRO, Canberra, Australia.
ASCU	Agricultural Scientific Collections Unit, New South Wales Department of Primary Industries, Orange, New South Wales, Australia.
PABM	Private Collection of Adam Broadley, Melbourne, Australia.
PKHH	Private Collection of Kai Heller, Heikendorf, Germany.
PWMP	Private Collection of Werner Mohrig, Puddemin/Rügen, Germany.
TAIC	Tasmanian Agricultural Insect Collection, Department of Primary Industries, Parks, Water and Environment, New Town, Tasmania, Australia.
VAIC	Victorian Agricultural Insect Collection, Agriculture Victoria, Department of Economic Development, Jobs, Transport and Resources, Bundoora, Victoria, Australia.

## Species descriptions

### *Austrosciara* Schmitz & Mjöberg, 1924

Type species: *Austrosciara termitophila* Schmitz & Mjöberg (1924) [Schmitz & Mjöberg (1924): 1–3, fig. 1]. Common synonym: *Ctenosciara* Tuomikoski, 1960.

**Literature:** Tuomikoski (1960): 110; Mohrig & Jaschhof (1999): 14–27; Mohrig *et al.* (1992); Menzel & Mohrig (2000): 293–299; Vilkamaa *et al.* (2012a): 37–51; Mohrig (2013): 123–136 (all as *Ctenosciara*); Mohrig *et al.* (2017c): 357–366, fig. 1 A–B, 2 A–D, 3 A–C, 4 A–E, 5 A–C.

### *Austrosciara heterospinata* sp. n.

(Fig. 1 A–C)

**Type locality:** Australia, New South Wales, Victoria Park, near Lismore.

**Holotype:** Male, 7.vi.1978, rainforest, leg. B.J. Loudon, ASCT00049053 (ASCU).

**Paratype:** 1 male, 29.iv.1978, New South Wales, Royal Nat. Park, leg. B.J. Loudon ASCT00050310 (PWMP).

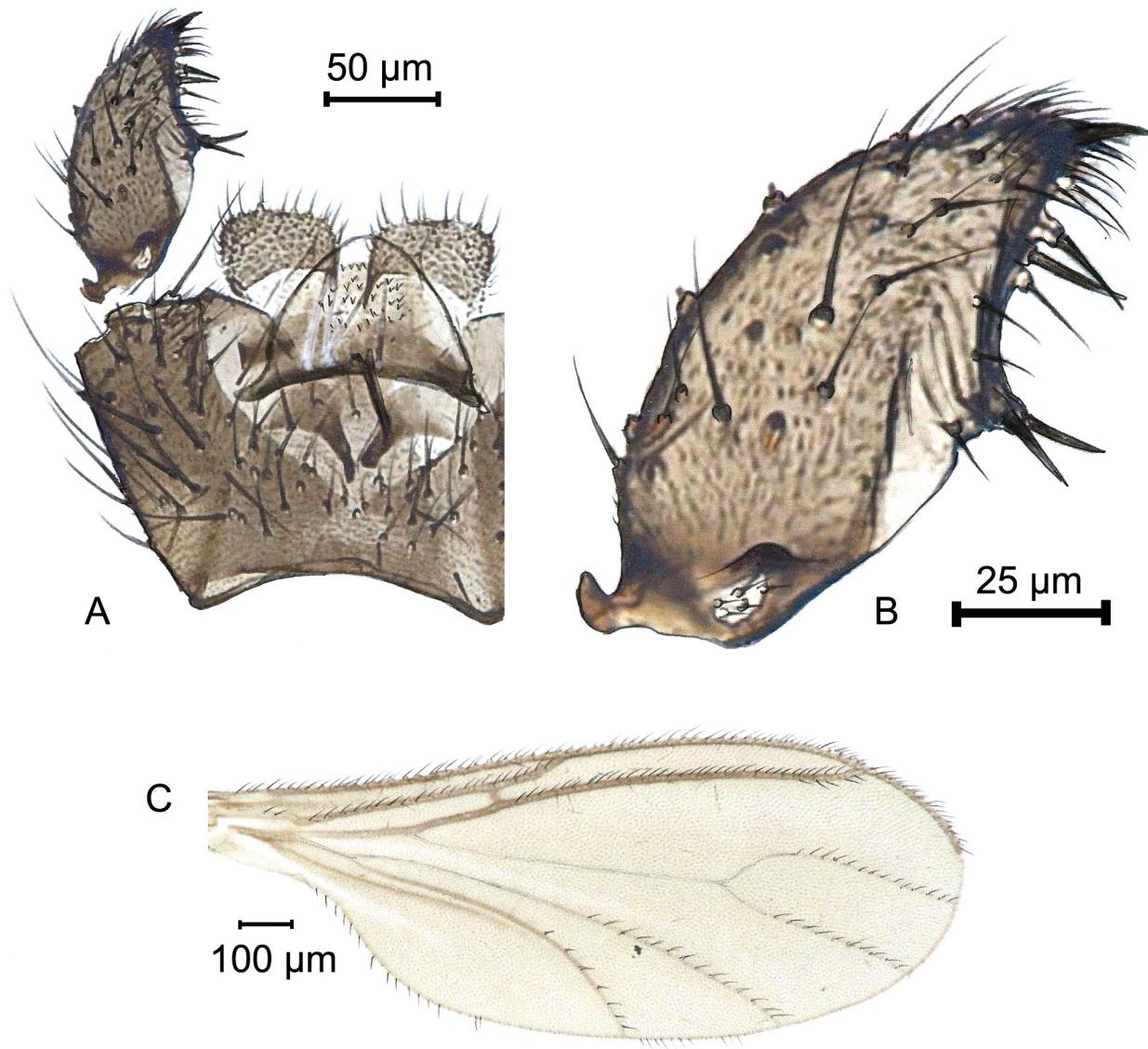
**Description.** Male. **Head.** Brown. Eye bridge 2–3 facets wide. Antenna dark brown; l/w index of 4<sup>th</sup> flagellomere about 2.2, the flagellomere with pale hairs somewhat longer than the diameter of the basal node; necks rather long. Palpus 3-segmented, pale, basal segment with one long bristle and a flat patch of sensillae.

**Thorax.** Brown. Scutum with short fine hairs, some lateral bristles longer; scutellum with 2 longer marginal bristles; postpronotum bare. Wing brownish; R<sub>1</sub> shorter than 1/2 R; R<sub>s</sub> in the distal third with ventral macrotrichia; C longer than 1/2 w; y = x and without macrotrichia; posterior veins with macrotrichia. Haltere short and brownish. Coxa somewhat paler than the brownish legs, tarsi darkened; apex of fore tibia with a broad comb of hyaline bristles; spurs of middle and hind tibiae equal in size, longer than the diameter of the apex; claws with fine teeth.

**Abdomen.** Brown, with rather sparse fine hairs. Hypopygium brown, the ventral base v-shaped; gonocoxites at the inner ventral margin with rather long hairs; gonostylus bulbous, pointed to the apex, apically with a tooth and 4 spines arranged as pairs in the distal half, the upper pair of spines crossed. Tegmen longer than broad, pyramid-like, with fine teeth. Aedeagus rather long. Body length: 2.2 mm.

**Comments.** The species is characterized by having macrotrichia on all posterior wing veins, a short-haired scutum and a bulbous gonostylus with 4 spines arranged in two pairs in the distal half.

**Distribution.** Australia: New South Wales.



**FIGURE 1.** *Austrosciara heterospinata* sp. n. A. Left side of the hypopygium; B. Gonostylus; C. Wing.

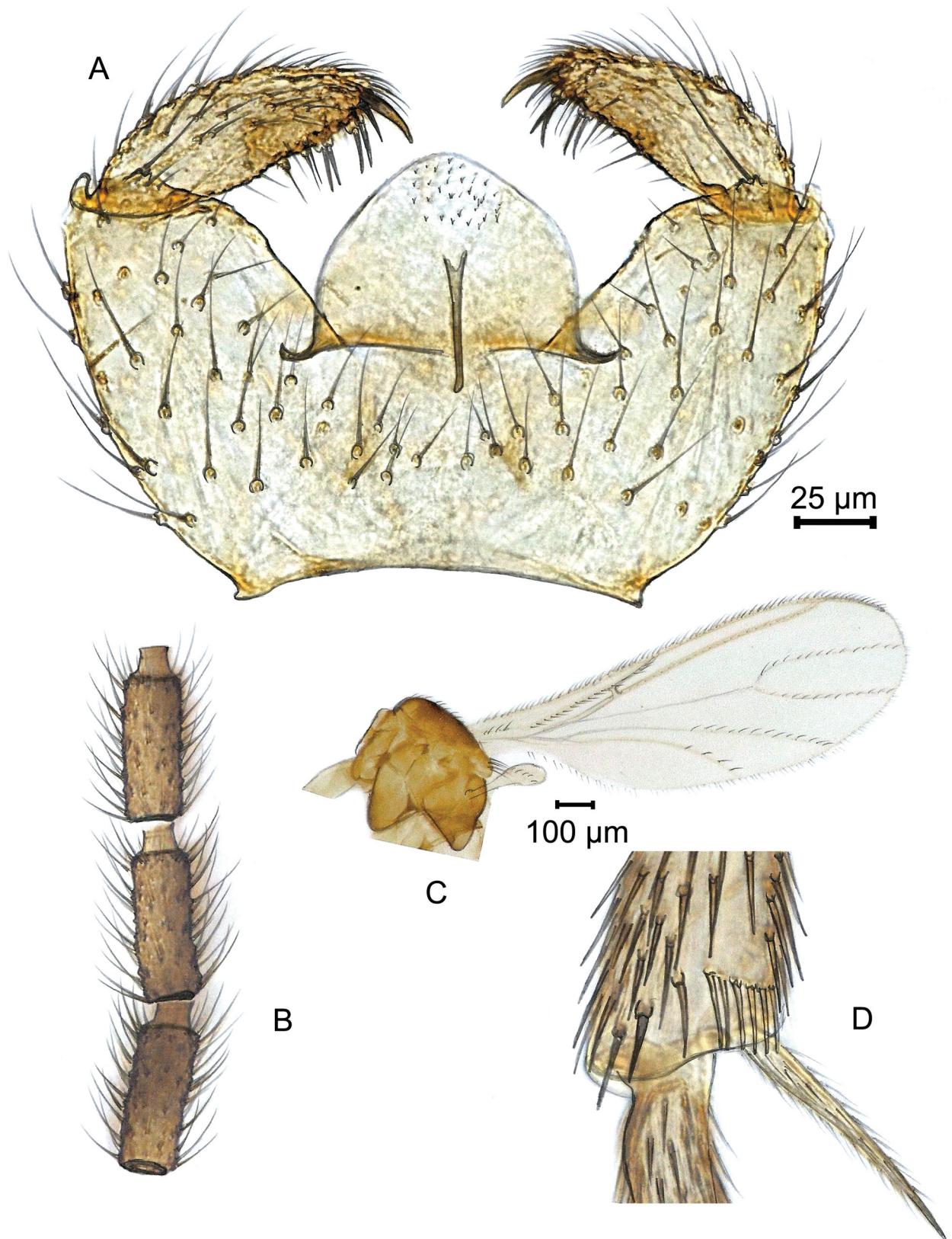
***Austrosciara kalliesi* sp. n.\***

(Fig. 2 A–D)

**Type locality:** Australia, New South Wales, Candelo (near Bega).

**Holotype:** Male, 17.–24.xii.1993, leg. A. Kallies (ANIC).

**Paratype:** 1 male, same data (PWMP).



**FIGURE 2.** *Austrosciara kalliesi* sp. n. A. Hypopygium; B. Flagellomeres 3–5; C. Thorax and wing; D. Tibial organ.

**Description.** Male. **Head.** Brown. Eye bridge 4 facets wide. Antenna brownish; 4<sup>th</sup> flagellomere with l/w index of about 2.4, with pale hairs somewhat longer than the diameter of the basal node; necks rather long. Palpus 3-segmented, pale, basal segment with 1-3 bristles and a flat patch of sensillae. **Thorax.** Yellowish-brown. Scutum with short hairs, some lateral and prescutellar bristles longer; scutellum with 4 longer marginal bristles; postpronotum bare. Wing pale;  $R_1 = 1/2 R$ ;  $R_5$  in the distal third with ventral macrotrichia; C weakly longer than 1/2 w; y = x and without macrotrichia; posterior veins with macrotrichia. Haltere short and bright. Coxae and legs yellowish, tarsi darkened; apex of fore tibia with a broad comb of hyaline bristles, one bristle isolated; spurs of middle and hind tibiae equal in size, longer than the diameter of the apex; claws without teeth. **Abdomen.** Brownish, with rather sparse fine hairs. Hypopygium brown, the ventral base wide and v-shaped; gonocoxites at the inner ventral margin with sparse hairs; gonostylus rather short, pointed to the apex and weakly darkened, apically with a rather robust tooth and 4-5 short spines in the distal third. Tegmen broader than long, flat and pyramid-like. Aedeagus rather long and thin. Body length: 2.2 mm.

**Comments.** The species is characterized by having macrotrichia on all posterior wing veins, brownish antenna, claws without teeth and a rather short gonostylus with an apical tooth and 4-5 shorter spines in the distal third of the inner side.

\*The species is named after Dr. Axel Kallies, who graduated from the Ernst-Moritz-Arndt University Greifswald, Germany and collected sciarids during an excursion throughout Australia. Professor Kallies is currently with the Department of Microbiology and Immunology at the Peter Doherty Institute for Infection and Immunity, The University of Melbourne. The authors are very thankful to him for obtaining this material to study.

**Distribution.** Australia: New South Wales.

*Austrosciara multispinulata* sp. n.

(Fig. 3 A-C)

**Type locality:** Australia, Australian Capital Territory, Black Mountain.

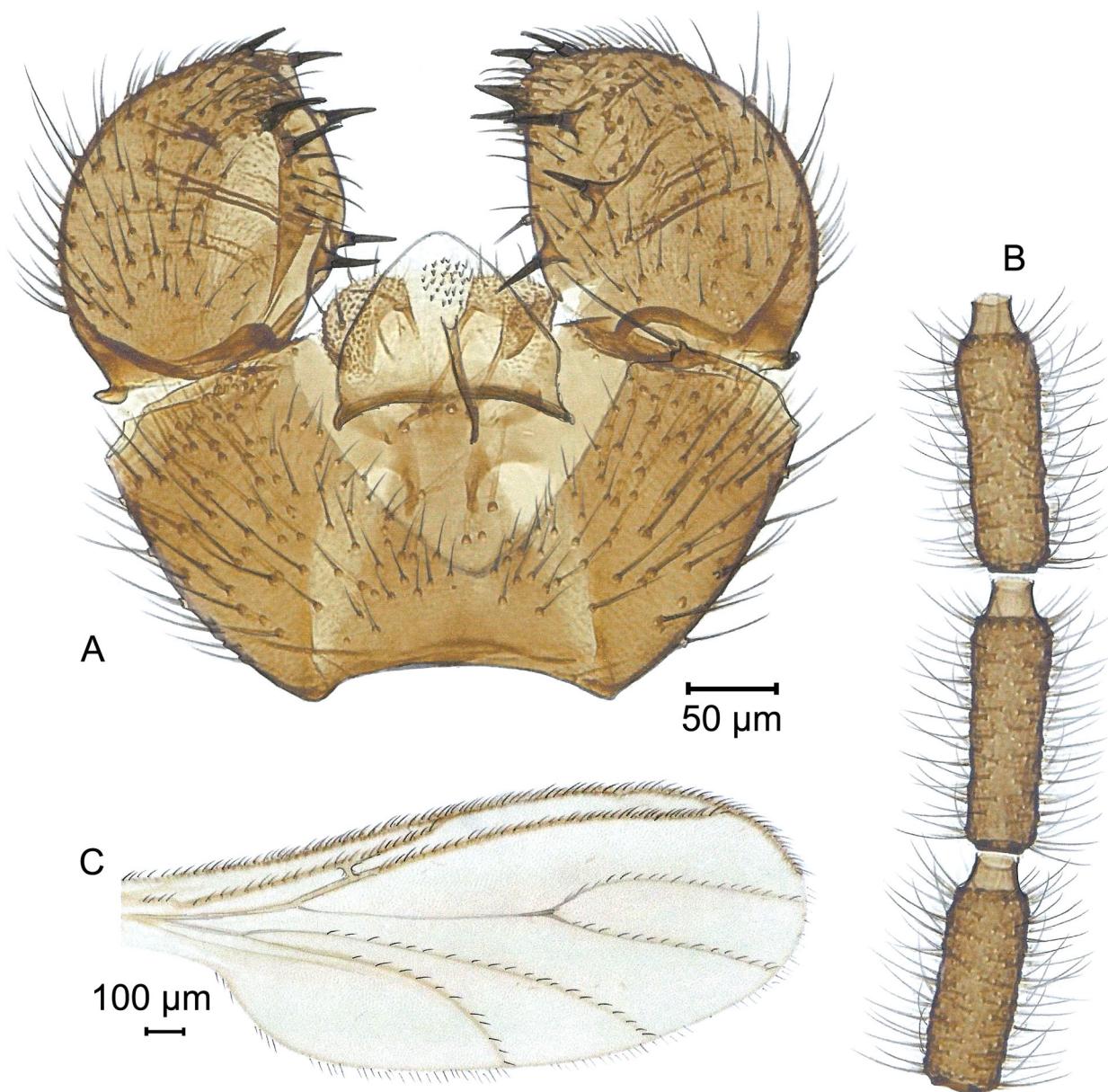
**Holotype:** Male, 20.v.1963, Malaise trap, CSIRO, leg. I.F.B. Common, ASCT00049056 (ASCU).

**Paratypes:** 3 males, Type locality, same data (2 in PWMP [ASCT00049057-58], 1 in ASCU [ASCT00049055]); 1 male, 7.vi.1978, N.S.W., Uralba Forest Reserve (Ballina), leg. B.J. Loudon, ASCT00050376 (PABM).

**Description.** Male. **Head.** Brown. Eye bridge 2-3 facets wide. Antenna brownish, with sparse and long erect hairs; 4<sup>th</sup> flagellomere with l/w index of nearly 4.0, hairs as long as the diameter of the basal node; neck brownish. Palpus 3-segmented, yellow, basal segment with 1-2 bristles and a patch of sensillae. **Thorax.** Brown. Scutum with fine pale hairs, some lateral and prescutellar bristles longer; scutellum with 4 longer marginal bristles; postpronotum bare. Wing pale;  $R_1 = 1/2 R$ ;  $R_5$  in the distal third with ventral macrotrichia; C longer than 1/2 w; y somewhat shorter than x, without macrotrichia; posterior veins with macrotrichia. Haltere short, yellowish. Coxae and legs brown; apex of fore tibia with a broad comb of hyaline bristles, with a weakly arched border; spurs of middle and hind tibiae equal in size, longer than the diameter of the apex; claws without teeth. **Abdomen.** Brownish, with short fine hairs. Hypopygium with a rather broadly v-shaped ventral base; gonocoxites at the inner ventral margin with short and sparse hairs; gonostylus large (nearly as long as the gonocoxite), oval and rounded, with short hairs, with 6 short spines, isolated and arranged on the inner side, the apical tooth of the same shape and size. Tegmen longer than broad, pyramid-like. Aedeagus rather long. Body length: 2.0 mm.

**Comments.** The species is characterized by macrotrichia on posterior wing veins, the large and bulbous-oval gonostylus with an apical tooth and 6 spines of nearly the same size and shape, isolated and arranged on the inner side, and long flagellomeres.

**Distribution.** Australia: Australian Capital Territory, New South Wales.



**FIGURE 3.** *Austrosciara multispinulata* sp. n. A. Hypopygium; B. Flagellomeres 3–5; C. Wing.

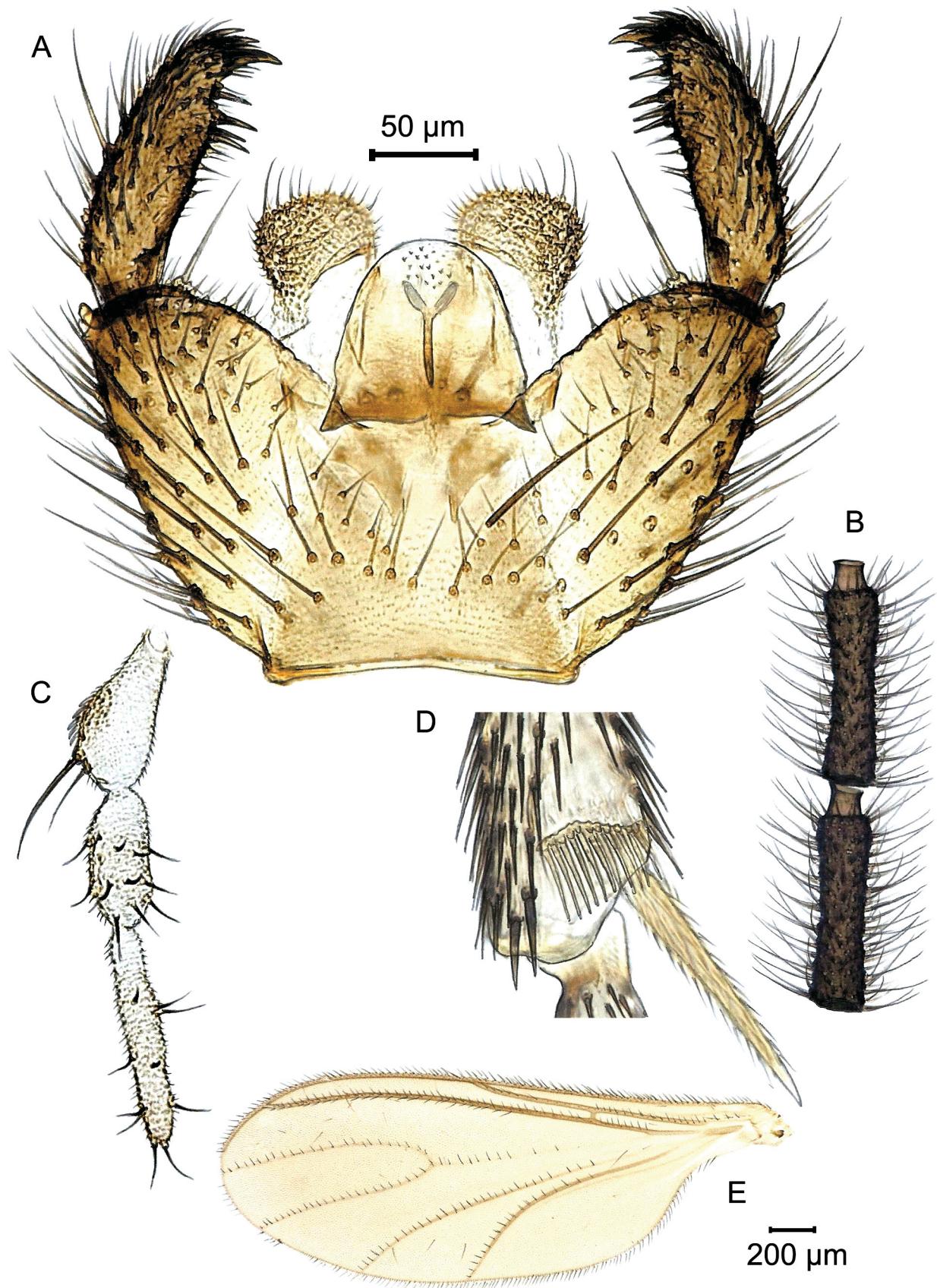
***Austrosciara stockerae* sp. n.\***

(Fig. 4 A–E)

**Type locality:** Australia, Victoria, Wilsons Promontory.

**Holotype:** Male, September 1977, Spring, leg. A.J. Stocker, ASCT00050341 (ASCU).

**Description.** Male. **Head.** Brown. Eye bridge 3 facets wide. Antenna long, brown, flagellomeres with dense, bristle-like hairs, twice as long as the basal node; 4<sup>th</sup> flagellomere with a l/w index of 4.0, necks brownish. Palpus 3-segmented, yellowish, basal segment with 2–3 bristles and a patch of sensillae. **Thorax.** Brown. Postpronotum bare. Wing slightly brownish; R<sub>1</sub> nearly = R; R<sub>5</sub> along nearly the entire length with ventral macrotrichia; C = 2/3 w; y = x, with macrotrichia; posterior veins with macrotrichia; Haltere short, yellowish. Coxae yellowish, legs somewhat darker; apex of fore tibia with a broad comb of hyaline bristles; spurs of middle and hind tibiae equal in



**FIGURE 4.** *Austrosciara stockerae* sp. n. A. Hypopygium; B. Flagellomeres 4–5; C. Palpus; D. Tibial organ; E. Wing.

size, longer than the diameter of the apex; claws with a sheet-like tooth. **Abdomen.** Brownish, with dark hairs. Hypopygium brownish, the ventral base v-shaped; gonocoxites at the inner ventral margin with short and sparse hairs; gonostylus short, narrow, with a short apical tooth and 2–3 spines above and 4 spines below the tooth in the distal half of the inner side. Tegmen small, apically rounded. Aedeagus rather short. Body length: 2.0 mm.

**Comments.** The species is characterized by having macrotrichia on y and all posterior wing veins, very long flagellomeres, a small gonostylus with an apical tooth and 6–7 spines, 2–3 above and 4 below in the distal half.

\* The species is dedicated to Dr Ann J. Stocker, who since 1972 has been working on genetic aspects of the Sciaridae, primarily on the genus *Rhynchosciara*. Ann collected extensively in Australia during the 1970's at many different sites including on the Atherton Table Lands, in the Melbourne region and at Wilsons Promontory. She also went on collecting trips with Ben Loudon when he worked at the Biological and Chemical Research Institute (BCRI) of the New South Wales Department of Agriculture, Rydalmere. Ann currently holds an honorary position in Ary Hoffmann's lab at the University of Melbourne where she works on chromosome evolution among a number of *Scaptodrosophila* (Drosophilidae) species.

**Distribution.** Australia: Victoria.

#### *Austrosciara trichovenosa* sp. n.

(Fig. 5 A–D)

**Type locality:** Australia, Victoria, Wilsons Promontory.

**Holotype:** Male, September 1977, leg. A.J. Stocker, ASCT00050344 (ASCU).

**Description.** Male. **Head.** Dark brown. Eye bridge 3–4 facets wide. Antenna brown; 4<sup>th</sup> flagellomere with l/w index of 4.0, hairs dark, somewhat longer than the diameter of the basal node; neck rather short, brown. Palpus 3-segmented, yellowish, basal segment with 2 bristles and a flat patch of sensillae. **Thorax.** Brown. Scutum with brown hairs, some lateral and prescutellar bristles longer; scutellum with 4 marginal bristles; postpronotum bare. Wing brownish; R<sub>1</sub> long, nearly =R; R<sub>5</sub> along nearly the entire length with ventral macrotrichia; C = 2/3 w; y = x, with macrotrichia; posterior wing veins with macrotrichia. Haltere short, brown. Coxae and legs brown; apex of fore tibia with a broad comb of hyaline bristles, not distinctly divided; spurs of middle and hind tibiae equal in size, longer than the diameter of the apex; claws without teeth. **Abdomen.** Brownish. Hypopygium rather broadly v-shaped on the ventral base; gonocoxites at the inner ventral margin with rather short hairs; gonostylus basally broad and bulbous, in the distal third pointed, with a rather short apical tooth and a subapical group of about 8–10 dense spines, somewhat shorter than the tooth. Tegmen pyramid-like, apically nearly straight, with fine teeth. Aedeagus rather long. Body length: 3.0 mm.

**Comments.** The species is characterized by long flagellomeres, macrotrichia on all posterior wing veins and a robust gonostylus with a dense group of about 10 spines below the small apical tooth.

**Distribution.** Australia: Victoria.

#### *Bradysia* Winnertz, 1867

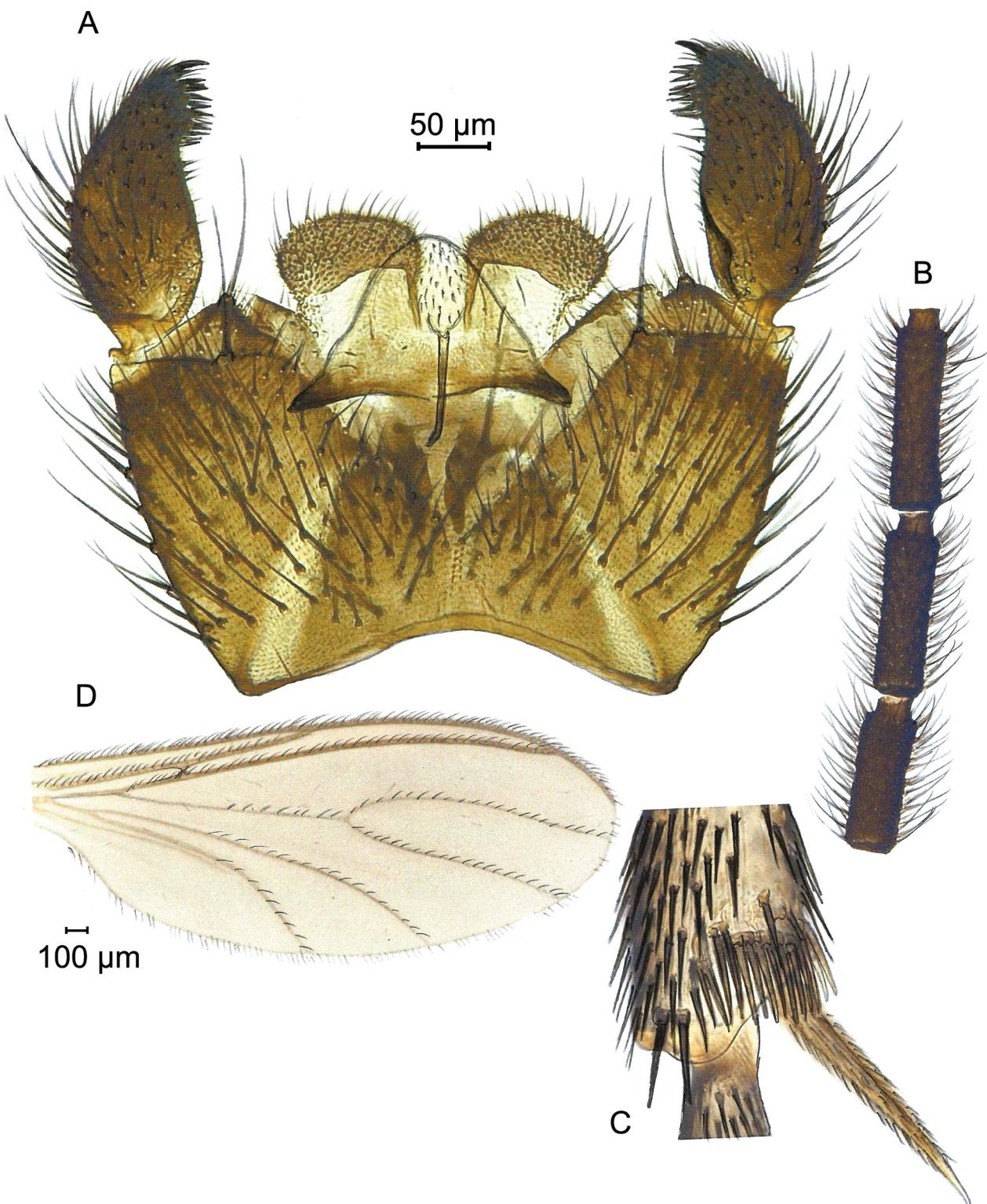
Type species: *Bradysia angustipennis* Winnertz, 1867 [Winnertz (1867): 180–181, plate, fig. 6 a].  
Literature: Tuomikoski (1960): 110–149; Menzel & Mohrig (2000): 98–185.

#### *Bradysia aspercera* Mohrig, 2016

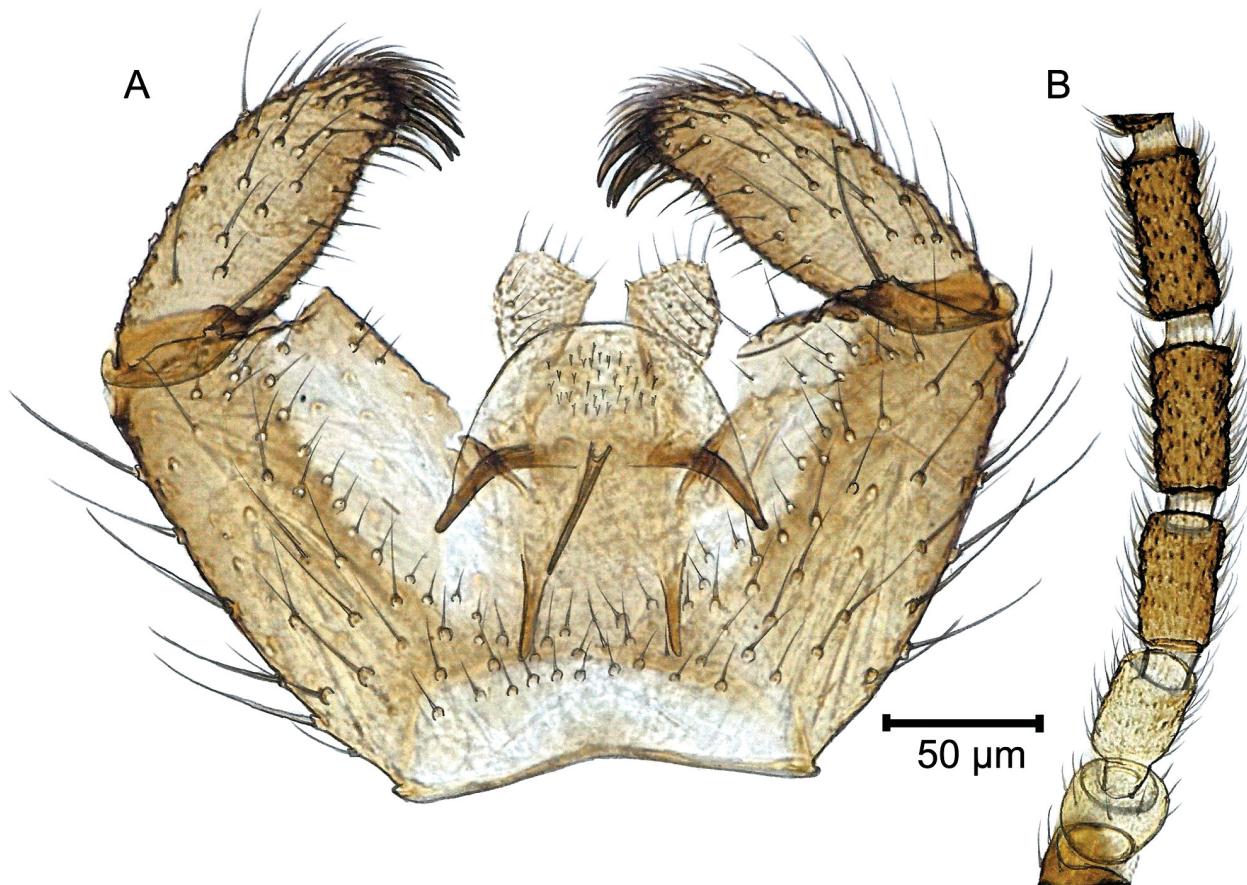
(Fig. 6 A–B)

*Bradysia aspercera* Mohrig, 2016 [Mohrig (2016): 5, fig. 2 a–d; plate I, fig. 1].

**Material:** 2 males, Australia, New South Wales, 17.–25.xii.1993, yellow pan trap, leg. A. Kallies (PWMP, PABM); 11 males, 2 females, 3.vii.2000, North-East Queensland, Palm Cove near Cairns, mangrove forest along the coastline, caught by net, leg. Mohrig (PWMP, 1 in PABM, 1 in PKHH).



**FIGURE 5.** *Austrosciara trichovenosa* sp. n. A. Hypopygium; B. Flagellomeres 3–5; C. Tibial organ; D. Wing.



**FIGURE 6.** *Bradysia aspercera* Mohrig, 2016. A. Hypopygium; B. Basal segments of antennae.

**Comments.** The species is characterized by the flagellomeres having a rough surface and strongly curved hairs, and a yellowish scape, pedicel and first flagellomere, bicoloured necks, short hairs at the base of the hypopygium and the inner margin of the gonocoxites, gonostylus without an apical tooth, but with an apical group of 4 rather strong spines. It is similar to *B. aspera* Mohrig and *B. quinquespina* Mohrig from Papua New Guinea. The species belongs to the *B. fungicola* group near to *B. scabricornis* Tuomikoski.

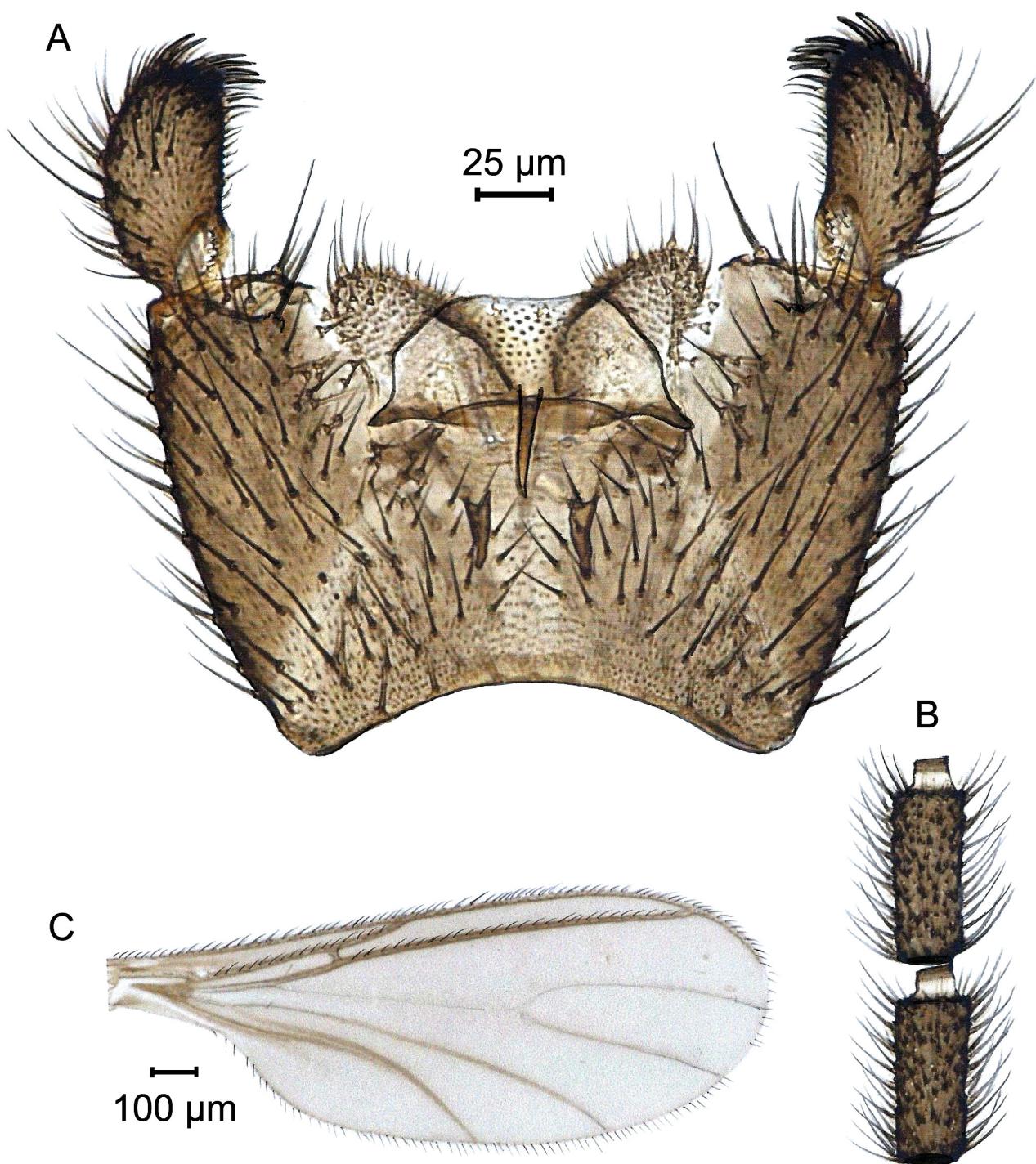
**Distribution.** Australia: New South Wales, Queensland; Papua New Guinea.

***Bradysia centidens* Vilkamaa, Hippa & Mohrig, 2012**  
(Fig. 7 A–C)

*Bradysia centidens* Vilkamaa, Hippa & Mohrig, 2012 [Vilkamaa et al. (2012b): 28, fig. 2 A–D].  
= *Bradysia mutuata* Mohrig, 2016 syn. n. [Mohrig (2016): 12–13, fig. 12 a–c].

**Type locality:** Papua New Guinea, Gulf Province, Lakekamu Basin.

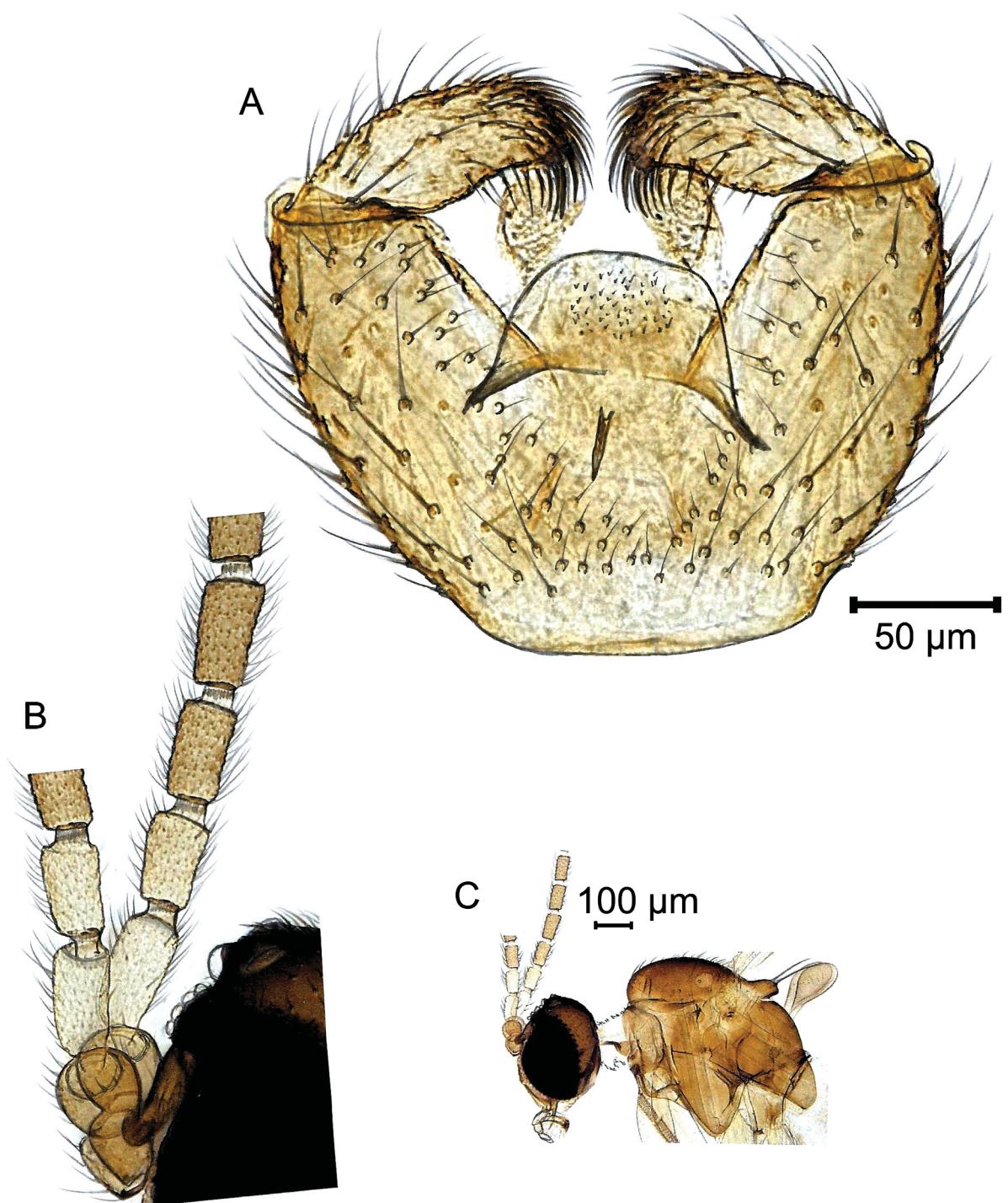
**Material:** 6 males, June 1979, New South Wales, Alstonville, light trap, leg. N.J. Cartwright (ASCT00053519-53522, ASCT00053551-53552, ASCT00053759); 1 male, June 1978, New South Wales, Alstonville, ASCT00053522; 2 males, 7.vi.1978, New South Wales, Alstonville, light trap, leg. B.J. Loudon (ASCT00053761-53762); 1 male, 29.iv.1978, New South Wales, Royal National Park, leg. B.J. Loudon, ASCT00053699 (5 in PWMP: ASCT00053521-522, ASCT00053552, ASCT00053761-762; 2 in PABM: ASCT00053699, ASCT00053759; 3 in ASCU: ASCT00053519-53520, 53551).



**FIGURE 7.** *Bradyzia centidens* Vilkamaa, Hippa & Mohrig, 2012. A. Hypopygium; B. Flagellomeres 4–5; C. Wing.

**Comments.** The species is characterized by the flagellomeres having bicoloured necks, and a rather short gonostylus with 6 apical spines, two of them isolated and arranged above the apex (dorsally). It belongs to the *B. hilaris* group.

**Distribution.** Australia: New South Wales; New Caledonia; Papua New Guinea.



**FIGURE 8.** *Bradysia chloroantennata* sp. n. A. Hypopygium; B. Basal segments of antennae; C. Head and thorax.

***Bradysia chloroantennata* sp. n.**  
(Fig. 8 A–C)

**Type locality:** Australia, New South Wales, Candelo (near Bega).

**Holotype:** Male, 17.–24.xii.1993, yellow trap, leg. A. Kallies (ANIC).

**Paratypes:** 3 males, November 2015, Victoria, Twin River Drive, South Morang, yellow pan trap in vegetable

garden, leg. A. Broadley, #86; (1 in PWMP, 2 in PABM); 1 male, 8.xi.1978, New South Wales, Jerilderie, sweep net, leg J. McGechan (ASCT00053769) (ASCU).

**Description.** Male. **Head.** Brown. Eye bridge 3–4 facets wide. Antenna brownish, surface nearly smooth, scape and pedicel brownish-ochrous, the first 2 flagellomeres yellowish; 4<sup>th</sup> flagellomere with a l/w index of 2.0, hairs pale, rather dense and as long as the diameter of the basal node; neck rather short, bicoloured. Palpus short, 3-segmented, yellowish, basal segment with 1 bristle and a distinct pit of sensillae. **Thorax.** Brown. Scutum with short and pale hairs, some lateral and prescutellar bristles longer; scutellum with 2 marginal bristles; postpronotum bare. Wing pale; R<sub>1</sub> short, nearly 1/2=R; R<sub>5</sub> without ventral macrotrichia; C = 2/3 w; y = x, without macrotrichia; posterior wing veins without macrotrichia. Haltere short, brown. Coxae and legs paler than pleura; apex of fore tibia with a small comb of bristles; spurs of middle and hind tibiae equal in size, longer than the diameter of the apex; claws without teeth. **Abdomen.** Brownish. Hypopygium yellowish-brown, the ventral base and the gonocoxites at the inner ventral margin with rather short sparse hairs; gonostylus short and robust, without an apical tooth, rounded apically and densely covered at the apex with hairs and robust spine-like bristles (distinct spines are not visible). Tegmen wider than long, with a large field of fine teeth. Aedeagus rather short. Body length: 2.0 mm.

**Comments.** The species is characterized by the yellow colour of the first 2 flagellomeres, a darker scape and pedicel, bicoloured necks, smooth surface of flagellomeres, sensory pit on the basal segment of the palpus, short R<sub>1</sub>, and a compact gonostylus without a tooth (the apex with strong bristle-like spines only). The species belongs to the *B. hilaris* group.

**Distribution.** Australia: New South Wales, Victoria.

### ***Bradysia conjuncta* (Skuse, 1890)**

*Sciara conjuncta* Skuse, 1890 [Skuse (1890): 403–404].

Literature: Broadley *et al.* (2016): 416–419, fig. 10 A–F.

**Material** [unless denoted otherwise all slides are deposited in ASCU]: 1 male, 17.–24.12.1993, New South Wales, Candelo, near Bega, yellow trap, leg. Kallies (PWMP); 2 males, 23.ix.1978, New South Wales, Bengalee, 8 km NW of Nowra, leg. M.J. Fletcher, ASCT00053648/53650; 2 males, June 1979, Alstonville, at MV light, leg. N. Cartwright, ASCT00053538/53550; 1 male, 6.ix.1977, New South Wales, Rydalmer, water trap, leg. B. Domidiak, ASCT00053616 (PWMP); 1 male, November 1978, New South Wales, Wollongbar, at M.V. light, leg. N. Cartwright, ASCT00053754; 2 males, New South Wales, Rydalmer, 8.xi.1976, light trap, ASCT00053591/53593 (PWMP); September 1979, New South Wales, Rydalmer, light trap, leg. B.J. Loudon ASCT00053579/53580 (PWMP)/53581/53582/53583/53587/53590/; 3 males, 30.iv.1981, New South Wales, Rydalmer, light trap, ASCT00053415 (PWMP)/53417/53418; 1 male, Wilsons Promontory, Spring, 1.ix.1977, leg. A.J. Stocker ASCT00053712; 1 male, 27.vii.1979, Rydalmer, light trap, ASCT00053597; 1 male, 7.vi.1978, Victoria Park (Lismore), rainforest, leg. B.J. Loudon, ASCT00053703; 1 male, 24.iv.1978, Royal National Park, leg. B.J. Loudon, ASCT00053695; 1 male, 29.iv.1978, Royal Nat. Park, leg. B.J. Loudon, ASCT00053700; 1 male, 18.ii.2010, Victoria, Barnawatha, on Plane tree, leg. C. Murdoch, VAIC73179 (VAIC); 1 male, November 2015, Victoria, Twin River Drive, South Morang, vegetable garden, leg. A. Broadley, #86 (PABM); 10 males, 13.–20.viii.2014, New South Wales, Ridge west of Lake George, dry sclerophyll gully on steep ridge, 34°59'43.5" S, 149°22'37.9" E, Malaise trap 3, Elev. 841 m, leg. J. Lumbers (PABM); 13 males, 3.–10.ix.2014, New South Wales, Ridge west of Lake George, dry sclerophyll gully on steep ridge, 34°59'24" S, 149°22'34" E, Malaise trap, leg. J. Lumbers (2 in ANIC/ 10 PWMP/ 1 PABM).

**Comments.** The species is characterized by having two macrosetae on the ventral apex of the gonocoxites, like *B. pernitida* (Skuse). The gonostylus is large, prolonged and at the end slightly inwardly curved. The shape of the gonostylus is variable depending on the position of the hypopygium on the slide. The hypopygium is very similar to *B. pernitida* (Skuse). The main difference is that *B. conjuncta* has much shorter flagellomeres.

**Distribution.** Australia: New South Wales, Victoria.

## *Bradysia exsequialis* (Skuse, 1890)

*Sciara exsequialis* Skuse, 1890 [Skuse (1890): 409–410].

Literature: Broadley *et al.* (2016): 421, Fig. 12 A–C.

**Material** [unless denoted otherwise all slides are deposited in ASCU]: 1 male, 5.v.1976, New South Wales, Rockley (near Oberon), water trap, ASCT00053436; 3 males, 14.vi.1979, Alstonville, light trap, leg. N.J. Cartwright, ASCT00053448/53554/54878 (PABM); 1 male, Jan. 1980, New South Wales, Doyalson, leg. G.R. Brown, ASCT00053437; 3 males, 6.xii.1978, New South Wales, Jerilderie, ASCT00053423/54870 (PABM)/54876; 2 males, 13.iv.1978, New South Wales, Bega, light trap, leg. A. Westcott, ASCT00053453/53454; 1 male, 10.xi.1976, New South Wales, Rydalmer, light trap, leg. B.J. Loudon, ASCT00054871; 3 males, 7.vi.1978, New South Wales, Alstonville, in light trap, leg. B.J. Loudon, ASCT00053447/54882/54895 (PABM); 1 male, May-June 1962, New South Wales, Bathurst, yellow tray trap, A.N.I.C. specimen, leg. R.D. Hughes, ASCT00054887; 2 males, 17.v.1977, New South Wales, Rydalmer, light trap, leg. B.J. Loudon, ASCT00053442/53443; 1 male, 24.ii.1978, New South Wales, Grose Vale, at MV light, leg. J.A. Humphreys, ASCT00116458; 1 male, 4.x.1978, New South Wales, Rydalmer, light trap, ASCT00053444; 1 male, 3.ii.1978, New South Wales, Doyalson, light trap, leg. G.R. Brown, ASCT00053438; 2 males, 12.xi.1976, New South Wales, Rydalmer, light trap, ASCT00053395/54883; 1 male, 29.iv.1977, New South Wales, Rydalmer, light trap, leg. B.J. Loudon, ASCT00054872; 2 males, 19.vii.1978, New South Wales, Rydalmer, 1<sup>st</sup> generation, lab. Culture, leg. B.J. Loudon, ASCT00054886/54896; 1 male, 13.v.1977, New South Wales, Rydalmer, light trap, ASCT00054888 (PWMP); 1 male, 7.vi.1978, New South Wales, Victoria Park (Lismore), Rainforest, leg. B.J. Loudon, ASCT00053420; 1 male, 9.v.1977, light trap, ASCT00049086; 1 male, 27.vii.1979, New South Wales, Rydalmer, light trap, ASCT00053394; 1 male, 7.iv.1979, New South Wales, Barrington Tops National Park, light trap, leg. G.R. Brown, ASCT00053433; New South Wales, Sydney in origin? leg. A.J. Stocker, ASCT00053435; 1 male, 7.vi.1978, Alstonville, light trap, leg. B.J. Loudon ASCT00053449; 1 male, 7.vi.1978, Victoria Park, Lismore, Rainforest, light trap, leg. B.J. Loudon; 4 males, 23.ix.1978, Bengalee, 8 km NW of Nowra, leg. M.J. Fletcher, ASCT00053430 (PWMP)/53431/53450 (PABM) /54875; 1 male, Victoria, Melbourne, leg. A.J. Stocker, ASCT00054894; 1 male, Nov. 1978, New South Wales, Wollongbar, light trap, leg. N.J. Cartwright, ASCT00053748; 1 male, 20.v.1963, Black Mts., A.C.T., Malaise trap, leg. I.F.B. Common, ASCT00054889 (PWMP); 1 male, Nov. 2015, Victoria, yellow pan trap, vegetable garden, leg. A. Broadley, #86 (PWMP); 1 male, 27.xi.2001, Tasmania, Bushy Park, on cherry tree in farm orchard, beating, leg. O. Seeman, #25 (Accession No. 130299) (TAIC).

**Comments.** The species is characterized by the brown body and legs, long flagellomeres (l/w index of 3.0), sparse and short hairs on the base of the hypopygium and on the inner ventral margin of the gonocoxites and a prolonged, slightly bulbous gonostylus without an apical tooth, but with 3–4 apical spines and 1–3 isolated spines inserted dorsally.

**Distribution.** Australia: New South Wales, Victoria, Tasmania.

## *Bradysia fuscovirgata* sp. n.

(Fig. 9 A–C)

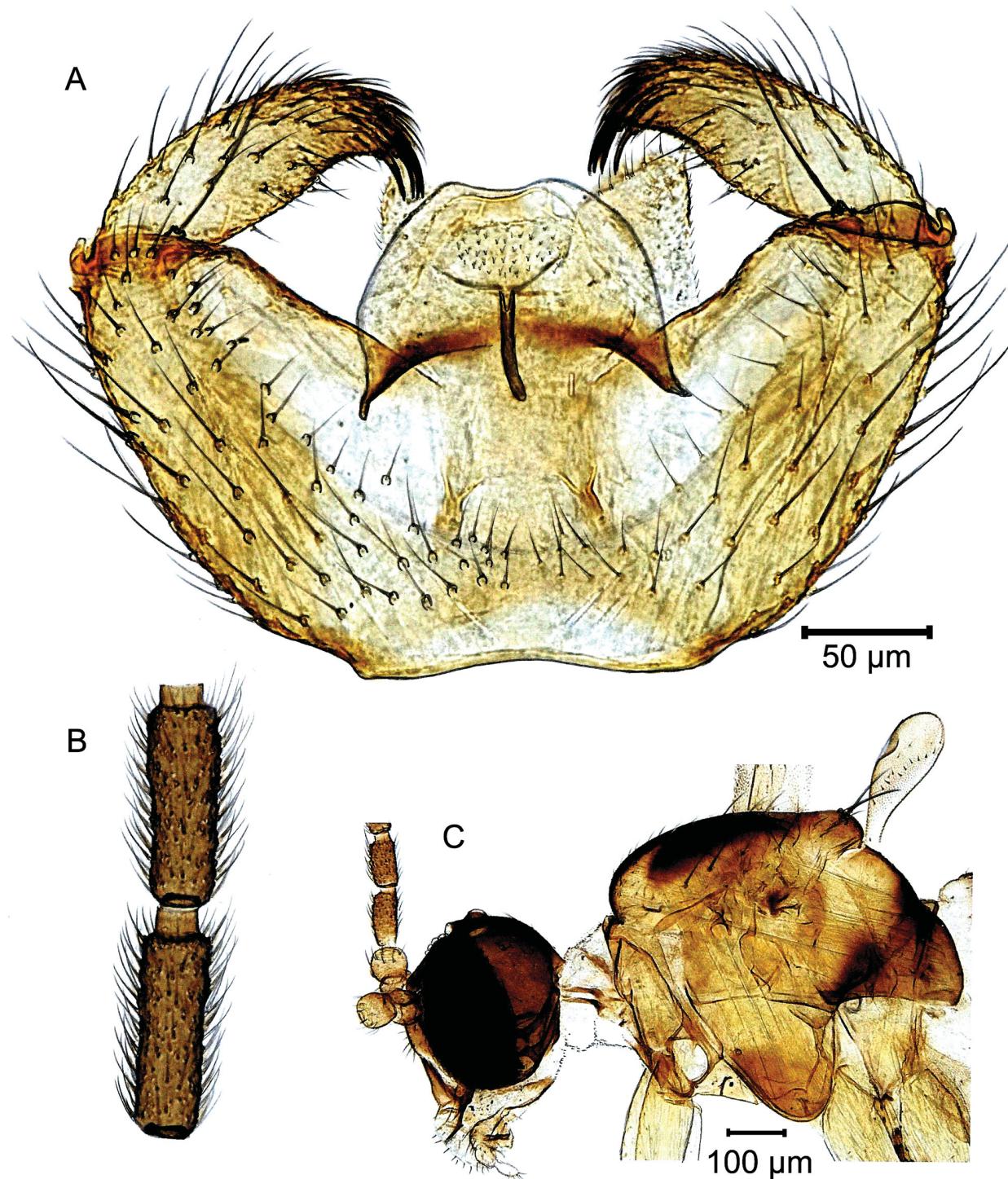
**Type locality:** New South Wales, Cadelo (near Bega).

**Holotype:** Male, 17.–24.xii.1993, yellow trap, leg. A. Kallies (ANIC).

**Paratypes:** 3 males, same locality, same data (2 in PWMP, 1 in PABM).

**Description.** Male. **Head.** Brown. Eye bridge 2–3 facets wide. Antenna brownish, surface nearly smooth, scape and pedicel somewhat paler, 4<sup>th</sup> flagellomere with l/w index of 3.0, hairs dense and as long as the diameter of the basal node; neck rather short, brownish. Palpus 3-segmented, yellowish, basal segment with 2–3 bristles and a flat sensory area. **Thorax.** Yellowish brown. Scutum yellowish with three darker stripes and short, fine and sparse hairs, some lateral bristles longer; scutellum with 2 marginal bristles; postpronotum bare, pleural sclerites yellow, katepisternum darkened at the tip, metanotum distally darkened. Wing slightly brownish;  $R_1 = 2/3 R$ ;  $R_s$  without ventral macrotrichia;  $C = 2/3 w$ ;  $y = x$ , without macrotrichia; posterior wing veins without macrotrichia. Haltere short, pale. Coxae and legs yellow; apex of fore tibia with a comb of bristles; spurs of middle and hind tibiae equal

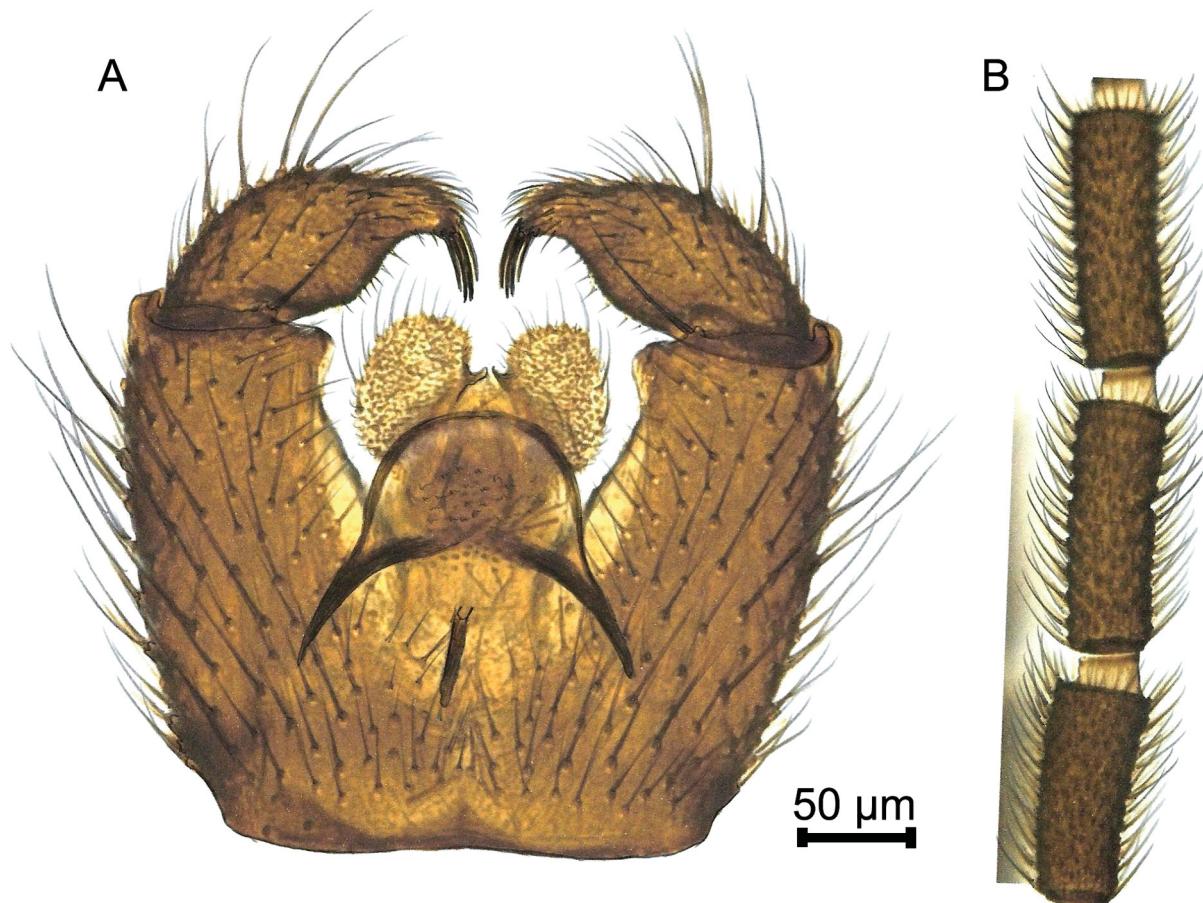
in size, longer than the diameter of the apex; claws without teeth. **Abdomen.** Brownish. Hypopygium yellowish-brown, the ventral base and the gonocoxites at the inner ventral margin with rather sparse and short hairs; gonostylus prolonged, weakly bulbous, pointed to the apex and darkened in the distal third; without an apical tooth but with 4 apical spines. Tegmen wider than long, rounded apically, with a large field of fine teeth. Aedeagus rather long. Body length: 2.2 mm.



**FIGURE 9.** *Bradysia fuscovirgata* sp. n. A. Hypopygium; B. Flagellomeres 4–5; C. Head and thorax.

**Comments.** The species is characterized by the yellow colour of the pleural sclerites, three dark stripes on the scutum, long flagellomeres, a prolonged and bulbous gonostylus without a tooth and with 4 apical spines. It belongs to the *B. hilaris* group, although the necks are not bicoloured.

**Distribution.** Australia: New South Wales.



**FIGURE 10.** *Bradysia gibbosa* Vilkamaa, Hippa & Mohrig, 2012. A. Hypopygium; B. Flagellomeres 3–5.

***Bradysia gibbosa* Vilkamaa, Hippa & Mohrig, 2012**

(Fig. 10 A–B)

*Bradysia gibbosa* Vilkamaa, Hippa & Mohrig, 2012 [Vilkamaa et al. (2012b): 33–34, fig. 6 A–D].

**Material:** 1 male, 22.iv.1978, New South Wales, Royal National Park, leg. B.J. Loudon, ASCT00053698 (PWMP); 1 male, 19.ii.1978, Dharug Nat. Park, leg. B.J. Loudon & A.J. Stocker, ASCT00053419 (PWMP); 2 males, 7. iv.1979, New South Wales, Barrington Tops Nat. Park, light trap, leg. G.R. Brown, ASCT00053632 (PABM) /53633 (ASCU).

**Comments.** The species is characterized by flagellomeres having weakly bicoloured necks, whitish halteres and a strongly bulbous gonostylus with 3 spines at the apex. It is similar to *B. loudoni* sp. n. It differs by being smaller in body size, having shorter flagellomeres and only three spines at the apex of the gonostylus. It belongs to the *B. hilaris* group.

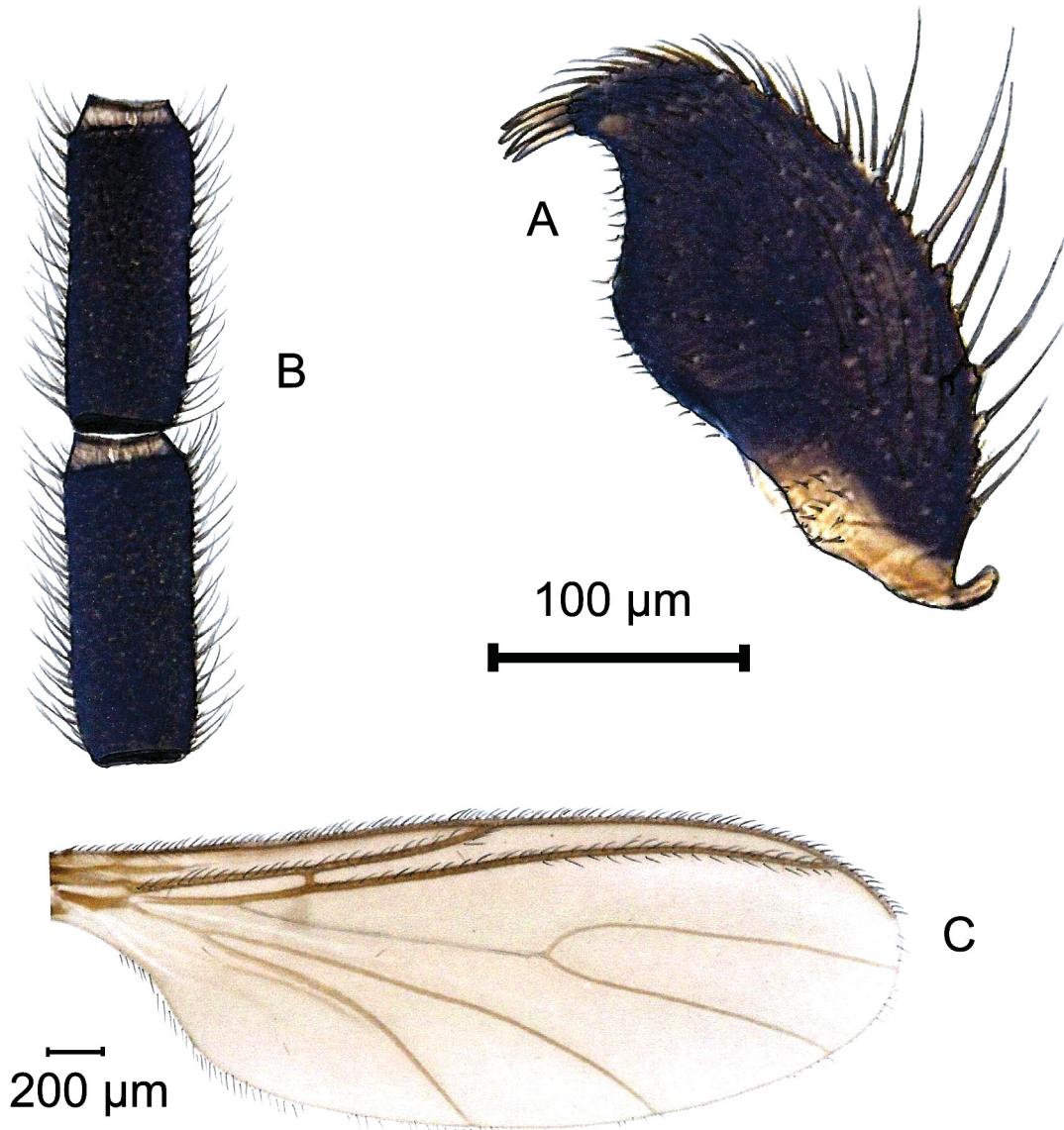
**Distribution.** Australia: New South Wales; New Caledonia.

*Bradysia loudoni* sp. n.\*

(Fig. 11 A–C)

**Type locality:** New South Wales, Mt. Kosciusko.

**Holotype:** Male, January 1978, in saw grass, leg. A. Stocker, ASCT00053645 (ASCU).



**FIGURE 11.** *Bradysia loudoni* sp. n. A. Gonostylus; B. Flagellomeres 4–5; C. Wing.

**Paratypes:** 2 males, same, locality, same data, ASCT00053644 (PWMP), ASCT00053720 (PABM).

**Description.** Male. **Head.** Dark brown. Eye bridge 3–4 facets wide. Antenna long, dark brown, 4<sup>th</sup> flagellomere with l/w index of 3.0, hairs dense and shorter than the diameter of the basal node; neck very short,

bicoloured. Palpus 3-segmented, brown, basal segment with 2 bristles and a deepened sensory area. **Thorax.** Dark brown. Scutum with rather long hairs, some lateral bristles longer; scutellum with 4 marginal bristles; postpronotum bare. Wing brownish;  $R_1$  long, =  $R$ ;  $R_s$  with ventral macrotrichia in the distal third;  $C = 2/3 w$ ;  $y$  somewhat shorter than  $x$ , without macrotrichia; M-fork long and narrow, posterior wing veins without macrotrichia. Haltere short, brown. Coxae and legs dark brown; apex of fore tibia with a comb of bristles; spurs of middle and hind tibiae equal in size, longer than the diameter of the apex; claws without teeth. **Abdomen.** Dark, with long and dense hairs. Hypopygium basally with short dense hairs, gonocoxites at the inner ventral margin with rather short sparse hairs; gonostylus short, the inner side bulbous, strongly pointed to the apex, without an apical tooth but with 4 apical spines. Tegmen wider than long, flatly rounded apically, with a large field of fine teeth. Aedeagus long. Body length: 4.8 mm.

\*The species is named after Ben J. Loudon, a technical officer who worked at the Biological and Chemical Research Institute (BCRI) of the New South Wales Department of Agriculture, Rydalmer, in the 1970s, where he and his colleagues established an extensive sciarid collection.

**Comments.** The species is characterized by the dark body colour, the large body size, the long flagellomeres and the bulbous gonostylus, strongly pointed to the apex, with 4 apical spines. It is similar to *B. gibbosa* Vilkamaa, Hippa & Mohrig in the shape of the gonostylus. It differs by the larger body size, the dark colour and the gonostylus with 4 apical spines.

**Distribution.** Australia: New South Wales.

***Bradysia macrotrichata* sp. n.**

(Fig. 12 A–D)

**Type locality:** New South Wales, Alstonville.

**Holotype:** Male, 7.vi.1978, light trap, leg. B.J. Loudon, ASCT00053766 (ASCU).

**Paratype:** 1 male, same data, ASCT00053760 (PWMP).

**Description.** Male. **Head.** Brown. Eye bridge 2–3 facets wide. Antenna brown, 4<sup>th</sup> flagellomere with l/w index of 2.4, hairs erect, rather dense and as long as the diameter of the basal node (the nodes on the slide-mounted specimens are somewhat swollen); neck very short, brown. Palpus 3-segmented, brownish, basal segment with 3–4 bristles and a flat sensory area. **Thorax.** Brown. Postpronotum bare. Wing brownish;  $R_1 = 2/3 R$ ;  $R_s$  with ventral macrotrichia;  $C = 2/3 w$ ;  $y = x$ , both with macrotrichia; posterior wing veins without macrotrichia. Haltere short, brown. Coxae and legs brown; apex of fore tibia with a comb of bristles; spurs of middle and hind tibiae equal in size, longer than the diameter of the apex; claws without teeth. **Abdomen.** Brown, with fine and sparse hairs. Gonocoxites at the inner ventral margin with rather short sparse hairs; gonostylus pointed to the apex, without an apical tooth, with 3–4 dense apical spines. Tegmen somewhat wider than long, rounded apically, with a few teeth. Aedeagus long. Body length: 2.2 mm.

**Comments.** The species is characterized by the brown body colour, gonostylus pointed and curved in apical fourth, without an apical tooth, with 3–4 apical spines, and macrotrichia on  $x$  and  $y$ .

**Distribution.** Australia: New South Wales.

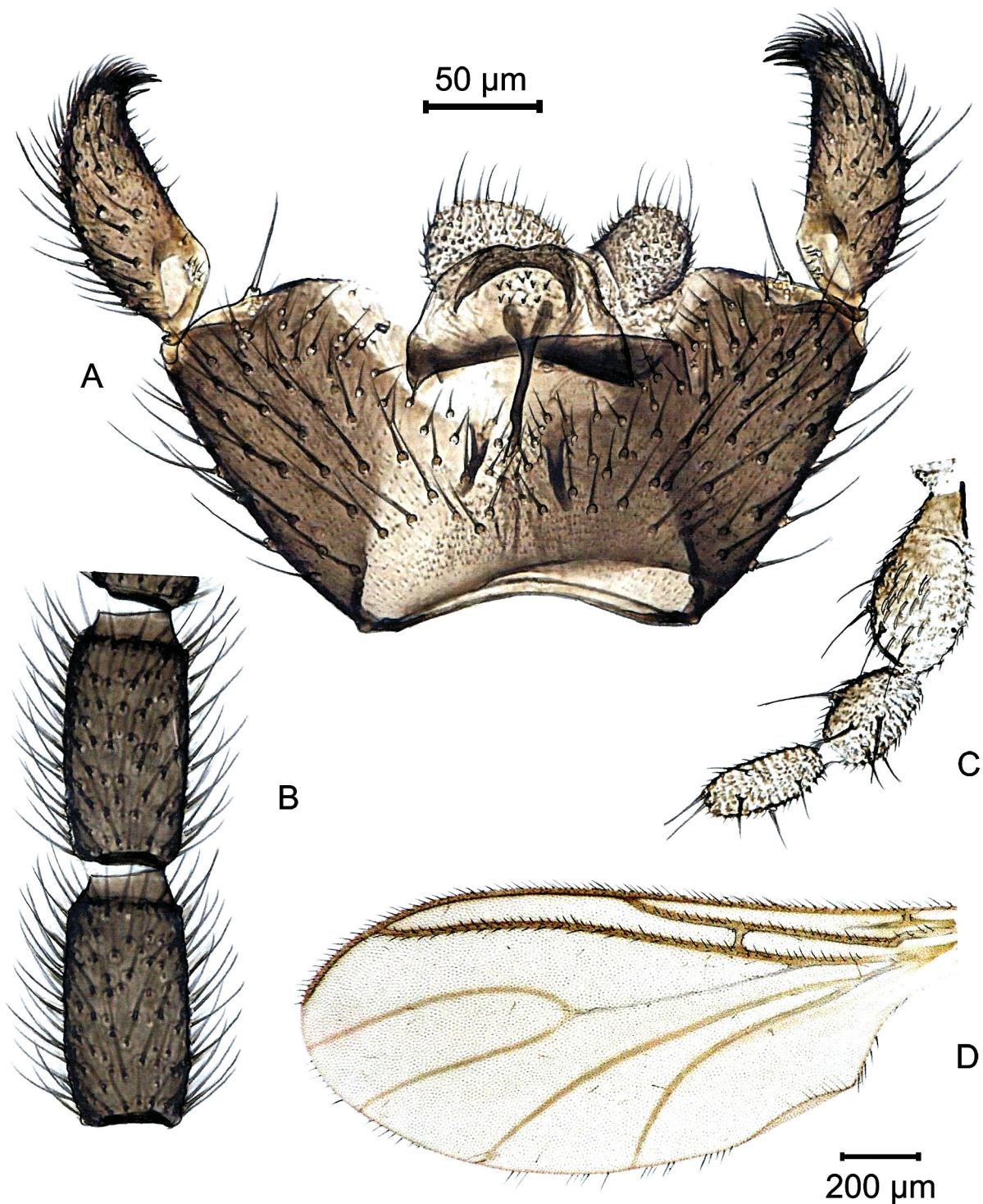
***Bradysia nigroantennata* sp. n.**

(Fig. 13 A–E)

**Type locality:** Australia, Victoria, Wilsons Promontory, Lilly Pilly Gully.

**Holotype:** Male, January 1978, leg. A. Stocker, ASCT00053639 (ASCU).

**Paratypes:** 1 male, 29.iv.1978, New South Wales, Royal National Park, leg. B.J. Loudon, ASCT00053562 (PWMP); 1 male, 26.iv.1980, New South Wales, Alstonville, light trap, leg. M.J. Cartwright, ASCT00053629 (PABM); 1 male, 14.–21.vi.1992, Victoria, Coranderrk, 2.5 km S of Healesville, 37°416'S, 145°317'E, *Eucalyptus viminalis*, Pitfall trap, leg. C. Meehan & D. Hooper (PWMP).



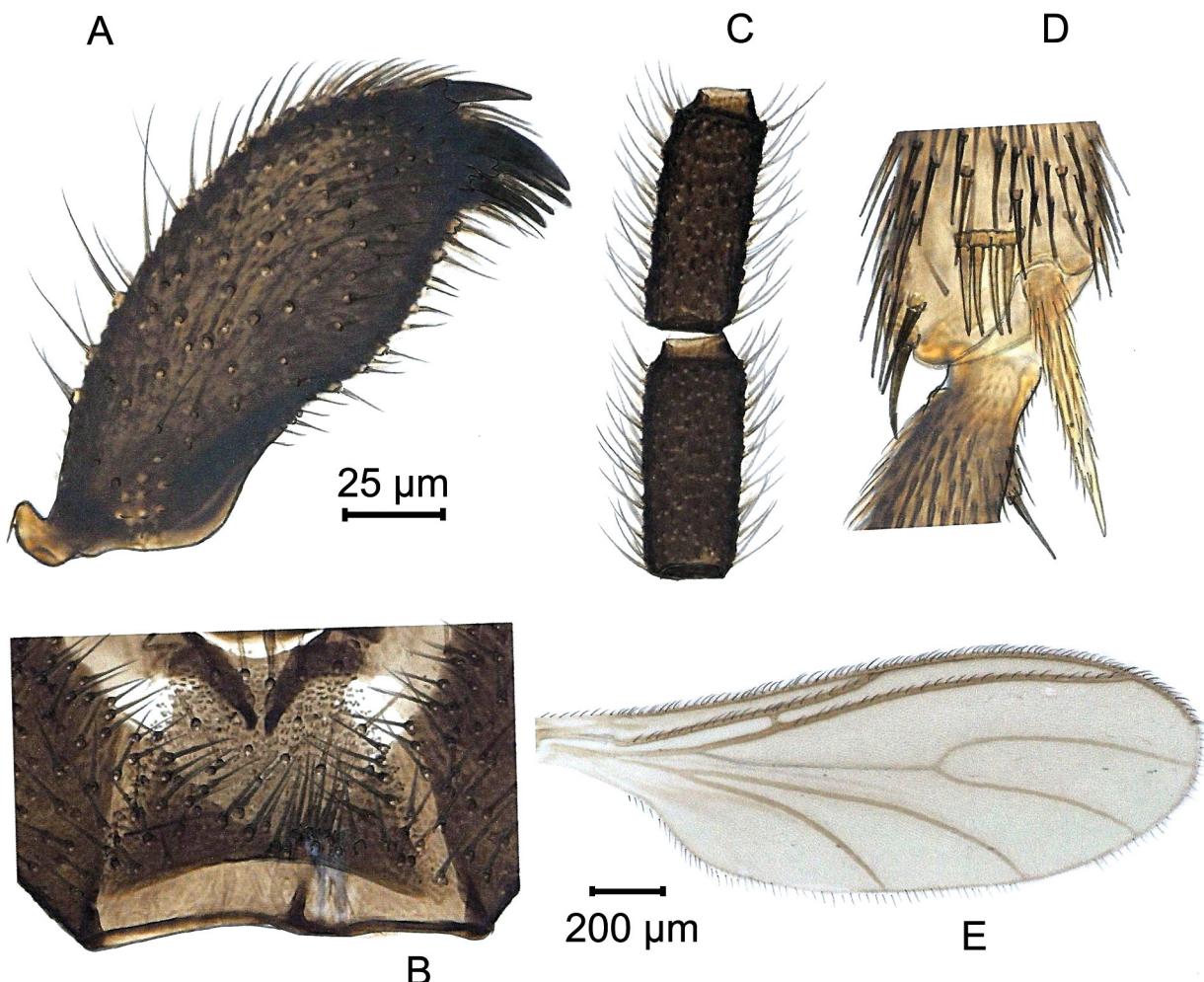
**FIGURE 12.** *Bradysia macrotrichata* sp. n. A. Hypopygium; B. Flagellomeres 3–4 (somewhat flattened); C. Palpus; D. Wing.

**Description.** Male. **Head.** Dark brown. Eye bridge 3 facets wide. Antenna dark brown, 4<sup>th</sup> flagellomere with l/w index of 2.6, hairs erect, rather dense and as long as the diameter of the basal node; neck very short, brownish. Palpus 3-segmented, brown, basal segment with 4–5 bristles and a deepened sensory area. **Thorax.** Dark brown. Scutum with rather short hairs, some lateral bristles longer; scutellum with 2 marginal bristles; postpronotum bare. Wing brownish; R<sub>1</sub> = 3/4 R; R<sub>s</sub> without ventral macrotrichia; C = 2/3 w; y = x, without macrotrichia; M-fork long and narrow, posterior wing veins without macrotrichia. Haltere short, brown. Coxae and legs brown; apex of fore

tibia with a small comb of bristles; spurs of middle and hind tibiae equal in size, longer than the diameter of the apex; claws without teeth. **Abdomen.** Brown, with short and sparse hairs. Hypopygium basally with an intergonocoxal lobe-like patch of bristles; gonocoxites at the inner ventral margin with rather short sparse hairs; gonostylus prolonged (a little shorter than gonocoxite), the inner side bulbous in the middle, with rather strong apical tooth, above with one isolated spine and 3–4 spines below. Tegmen as wide as long, rounded apically, with a semicircular structure. Aedeagus long. Body length: 2.5 mm.

**Comments.** The species is characterized by the dark body colour, the lobe-like intergonocoxal patch of bristles, prolonged gonostylus with strong apical tooth and 4–5 strong spines, one above the tooth, 3(4) below.

**Distribution.** Australia: New South Wales, Victoria.



**FIGURE 13.** *Bradysia nigroantennata* sp. n. A. Gonostylus; B. Ventral base of hypopygium; C. Flagellomeres 4–5; D. Tibial organ; E. Wing.

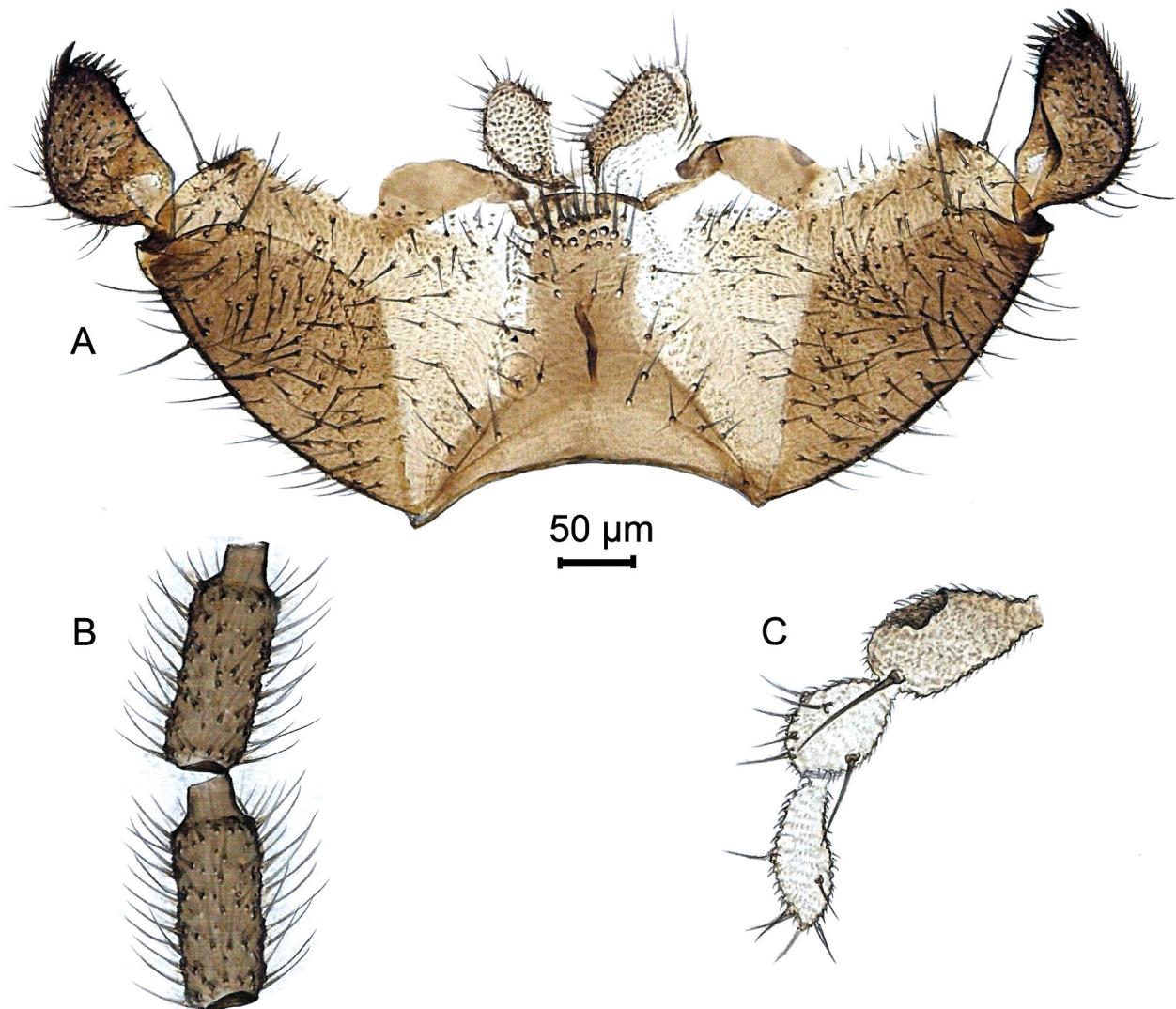
#### *Bradysia parareflexa* sp. n.

(Fig. 14 A–C)

**Type locality:** Australia, New South Wales, Rydalmer.

**Holotype:** Male, 11.ii.1977, light trap, leg. B.J. Loudon, ASCT00053603 (ASCU).

**Paratypes:** 2 males, same data, ASCT00053600 (PWMP), ASCT00054902 (PABM); 1 male, 4.x.1978, Rydalmer, light trap, ASCT00053599 (PABM); 1 male, 7.iii.1977, ASCT000138716 (PWMP).



**FIGURE 14.** *Bradysia parareflexa* sp. n. A. Hypopygium; B. Flagellomeres 4–5; C. Palpus.

**Description.** Male. **Head.** Brown. Eye bridge 2–3 facets wide. Antenna brown, 4<sup>th</sup> flagellomere with l/w index of 2.4, hairs sparse, erect and as long as the diameter of the basal node; neck very short, bicoloured. Palpus 3-segmented, basal segment with 1 bristle and a deepened sensory area. **Thorax.** Brown. Scutum with short hairs, some lateral bristles longer; scutellum with 4 marginal bristles; postpronotum bare. Wing pale;  $R_1 = 3/4 R$ ;  $R_s$  without ventral macrotrichia; C somewhat longer than 1/2 w; y somewhat longer than x, without macrotrichia; posterior wing veins without macrotrichia. Haltere short, pale. Coxae and legs brownish; apex of fore tibia with a comb of bristles; spurs of middle and hind tibiae equal in size, longer than the diameter of the apex; claws without teeth. **Abdomen.** Dark, with fine hairs. Hypopygium basally without a lobe or dense hairs, gonocoxites on the outside and on the inner side with strikingly shaggy hairs (hairs directed out and downwards), at the inner ventral margin with rather short sparse hairs; gonostylus short, the outside strongly arched, with short and shaggy hairs, with short apical tooth and 5–6 shorter spines. Tegmen wide, rounded apically, with a small field of fine teeth. Aedeagus rather long. Body length: 2.2 mm.

**Comments.** The species belongs to the *B. pallipes* group near to the species *B. reflexa* Tuomikoski and *B. xenoreflexa* Mohrig & Menzel. All three species are characterized by the shaggy arranged hairs on the gonocoxites and the gonostylus. *B. parareflexa* differs from both species by having a shorter gonostylus of a different shape, shorter hairs at the ventral inner side of gonocoxites and longer hairs on the flagellomeres.

**Distribution.** Australia: New South Wales.

### ***Bradysia pernitida* (Skuse, 1888)**

(Fig. 15 A–C)

*Sciara pernitida* Skuse, 1888 [Skuse (1888): 685–686].

Literature: Broadley *et al.* (2016): 432, fig. 19 A–C.

**Material:** 1 male, 11.iv.–14.vi.1995, Victoria, Otway Ranges, Aire Crossing Tk, 0.5 km N of Aire, 38°42' S, 143°29' E, *Notophagus cunninghamii* forest, pitfall trap, leg. G. Milledge (PWMP).

**Comments.** The specimen examined here is the first detection made after the species was described by Frederick Skuse more than a century ago. It is characterized by two macrosetae at the apex of the gonocoxites on the ventral side. It is similar to *B. conjuncta* Skuse in the shape of the hypopygium but differs by having very long flagellomeres.

**Distribution.** Australia: New South Wales, Victoria.

### ***Bradysia pictipes* (Skuse, 1888)**

*Sciara pictipes* Skuse, 1888 [Skuse (1888): 721–722].

Literature: Broadley *et al.* (2016): 432–435, fig. 20 A–E; Vilkamaa *et al.* (2012b): 39–41, fig. 11 A–D (as *Bradysia seticornis* Vilkamaa, Hippa & Mohrig, 2012).

**Material:** 5 males, 17.–18.ii.2010, Victoria, Barnawatha, on Plane tree, leg. C. Murdoch (VAIC73179/73180)(VAIC); 1 male, 14.xii.1978, New South Wales, Jerilderie, rotating net trap, leg. unknown, ASCT000138591 (ASCU); 2 males, 7.iii.1977, Rydalmere, light trap, ASCT000138716 (PWMP); 1 male, 21.vii.1977, Condobolin, ASCT00054877 (PWMP), all leg. B.J. Loudon; 2 males, 27.xi.2001, Tasmania, Bushy Park, on cherry tree in fruit orchard, leg. O. Seeman, (#25, Accession No. 130299) (PABM/TAIC).

**Comments.** The species is characterized by the brown body colour, long and thin flagellomeres with short hairs and brownish necks, slightly bulbous gonostylus without an apical tooth, with 3–4 apical spines and 1–2 dorsally arranged spines, and a rounded tegmen with a large area of scale-like teeth. It belongs perhaps to the *B. procera* group.

**Distribution.** Australia: New South Wales, Tasmania, Victoria.

### ***Cratyna* Winnertz, 1867**

Type species: *Cratyna atra* Winnertz, 1867 [Winnertz (1867): 167, fig. 7].

Common synonym: *Plastosciara* Berg, 1899.

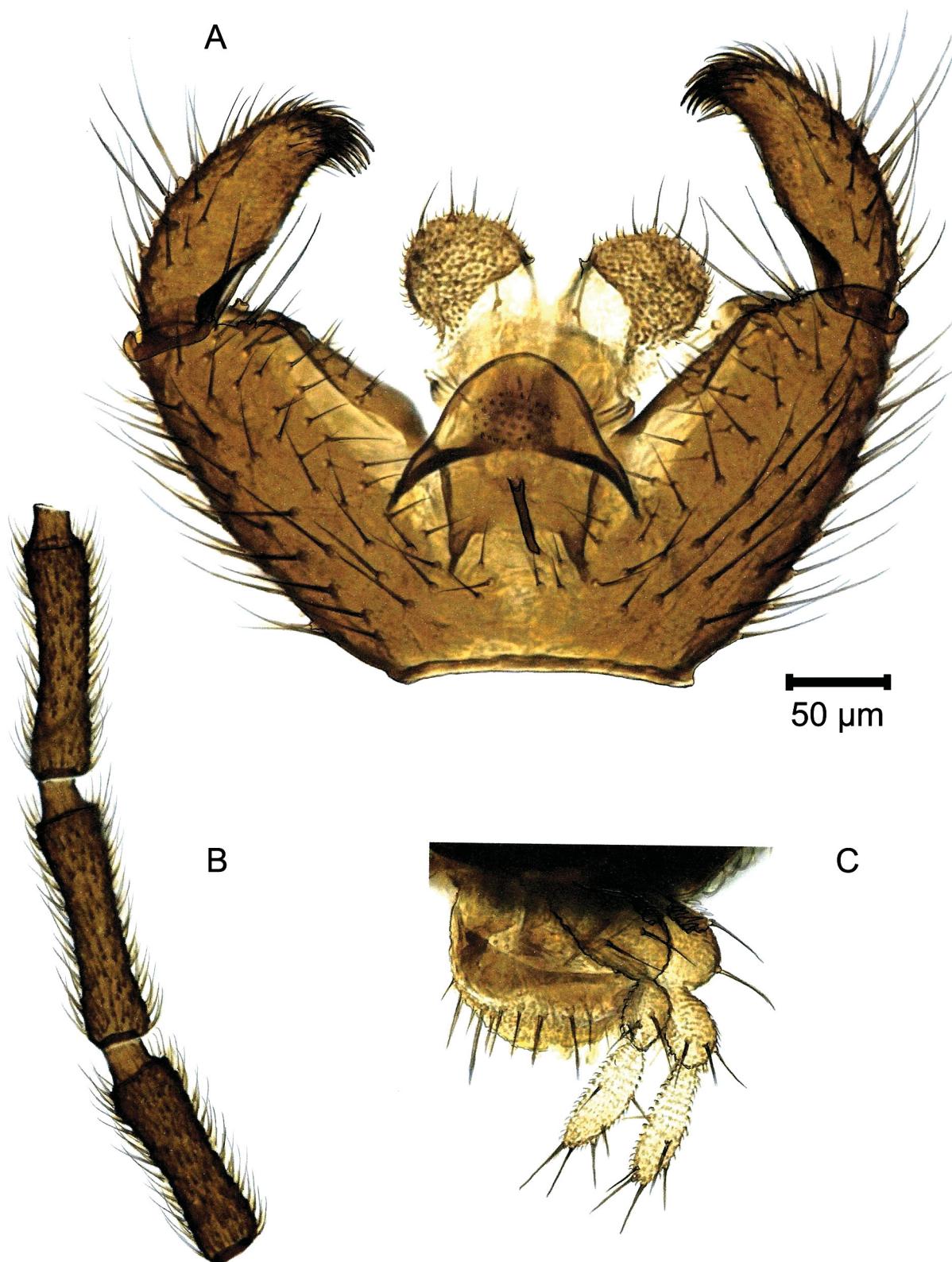
### **Subgenus *Peyerimhoffia* Kieffer, 1903**

Type species: *Peyerimhoffia brachyptera* Kieffer, 1903 [Kieffer (1903): 198–200, fig. 1, plate I, figs 1, 6, 8].

Literature: Tuomikoski (1960): 40–41; Menzel & Mohrig (2000): 268–269, 85–86, figs 230–234; Vilkamaa & Hippa (2005): fig. 12 C, D; Shi *et al.* (2014): 67–83, fig. 1 A–E, fig. 2 A–E.

The subgenus *Peyerimhoffia* is characterized by a large palpus with few bristles, consisting of just one segment (sometimes with a reduced second segment) without a deepened sensory area and a non-differentiated tibial organ without a semicircular structure. The postpronotum is mostly with a few short bristles. The gonostylus is short and bulbous-oval in shape and has a large tooth with a distinct fissure medially. It is known from the Palaearctic region and only 5 species have so far been described.

**Comments.** *Cratyna* (Pey.) *vagabunda* was temporarily united with species of the *Corynoptera crassistylata* group in a newly established genus *Peyerimhoffia* based on convergent structures of the gonostylus (Vilkamaa & Hippa 2005; Shi *et al.* 2014). However, *Cratyna vagabunda* has nothing to do with species of the *Corynoptera crassistylata* group. *Cratyna vagabunda* belongs without doubt to the genus *Cratyna* mainly by having a 1-segmented palpus and a non-differentiated tibial organ. A recent molecular phylogenetic analysis demonstrated that



**FIGURE 15.** *Bradysia pernitida* (Skuse). A. Hypopygium; B. Flagellomeres 3–5; C. Mouthparts and palpi.

the species *Peyerimhoffia vagabunda* is related to species of *Cratyna* s. str. and *Spathobdella* (Shin *et al.* 2013). From the seven species described by Shi *et al.* only *Cratyna hamata* (Shi & Huang) **comb. n.** and *Cratyna obesa*

(Shi & Huang) **comb. n.** belong to the subgenus *Peyerimhoffia*. The other five species are newly combined in the genus *Corynoptera*, *crassistylata* group [*C. sparsula* (Shi & Huang) **comb. n.**, *C. brachypoda*\* (Shi & Huang) **comb. n.**, *C. yunnana* (Shi & Huang) **comb. n.**, *C. shennongiana* (Shi & Huang) **comb. n.** and in *Corynoptera* s. str. [*Corynoptera longiprojecta* (Shi & Huang) **comb. n.**]. *Corynoptera longiprojecta* (Shi & Huang) is identical in all details with *Corynoptera diversicalcaria* Mohrig, 2004 from Papua New Guinea and a junior synonym to the latter.

\**Peyerimhoffia brachypoda* Shi & Huang (2014) is spelled *brachypodua* in the Abstract and *brachypoda* throughout the rest of the paper, being alternative original spellings. We hereby acting as the First Reviser, select the spelling *brachypoda* as valid, so that the spelling *brachypodua* is an incorrect original spelling (Art. 24.2.3), (ICZN 1999).

***Cratyna (Peyerimhoffia) subvagabunda* sp. n.**

(Figs 16 A–F, 17 A–B)

**Type locality:** Australia, Australian Capital Territory, Canberra.

**Holotype:** Male, 22.iv.1978, “thousands in lawn”, leg B.J. Loudon, ASCT00049070 (ASCU).

**Paratypes:** 6 males, 6 females, same locality, same data (ASCT00049074-76 and ASCT00049067-69 in PWMP, 1 male, 1 female, ACT00049072 and 073 in PABM, 1 male (078), 2 females (071 & 077) in ASCU). The specimens are rather badly damaged. Nevertheless, we will give a description, because our current state of knowledge about species of the subgenus *Peyerimhoffia* and their distribution is rather poor.

**Description.** Male. **Head.** Brown. Eye bridge 2–3 facets wide. Antenna brown, 4<sup>th</sup> flagellomere with a l/w index between 1.2 and 1.4, hairs sparse, erect and as long as the diameter of the basal node; neck very short, brown. Palpus reduced, 1-segmented, thick, with 4–5 bristles and a flat sensory area. **Thorax.** Brown. Scutellum with several marginal bristles. Postpronotum with 1–2 short bristles. Wing brownish, in both sexes sometimes reduced by varying degrees; R<sub>1</sub> nearly R; R<sub>5</sub> without ventral macrotrichia; C = 2/3 w; y = x, without macrotrichia; posterior wing veins without macrotrichia. Haltere short, brown. Coxae and legs brownish, short and robust; apex of fore tibia with a patch of irregularly arranged bristles; spurs of middle and hind tibiae equal in size, as long as the diameter of the apex; claws without teeth. **Abdomen.** Brown, with rather long hairs. Hypopygium basally without a lobe or dense hairs; gonocoxites short and robust, at the inner ventral margin with rather short hairs; gonostylus short-ovoid, with a rather long apical tooth and 3–5 longer bristles below. Tegmen wide, rounded apically. Aedeagus short. Body length: 2.8 mm.

**Female.** Eye bridge 2 facets wide; flagellomeres very short, l/w index of 1.0; palpus 1-segmented; wings as in males reduced by varying degrees (fully winged up to brachypterous); legs short and robust, abdomen long. Body length: 3.5 mm.

**Comments.** The species is characterized by having short flagellomeres, a large 1-segmented palpus with 5–6 bristles and without a deepened sensory area, short gonocoxites, gonostylus with a rather long tooth and a few longer bristles subapically, and a wide tegmen. It is similar to the Holarctic species *C. vagabunda* and differs by having a shorter apical tooth, shorter flagellomeres and a simple tegmen. Thousands of specimens were found in a lawn.

**Distribution.** Australia: Australian Capital Territory.

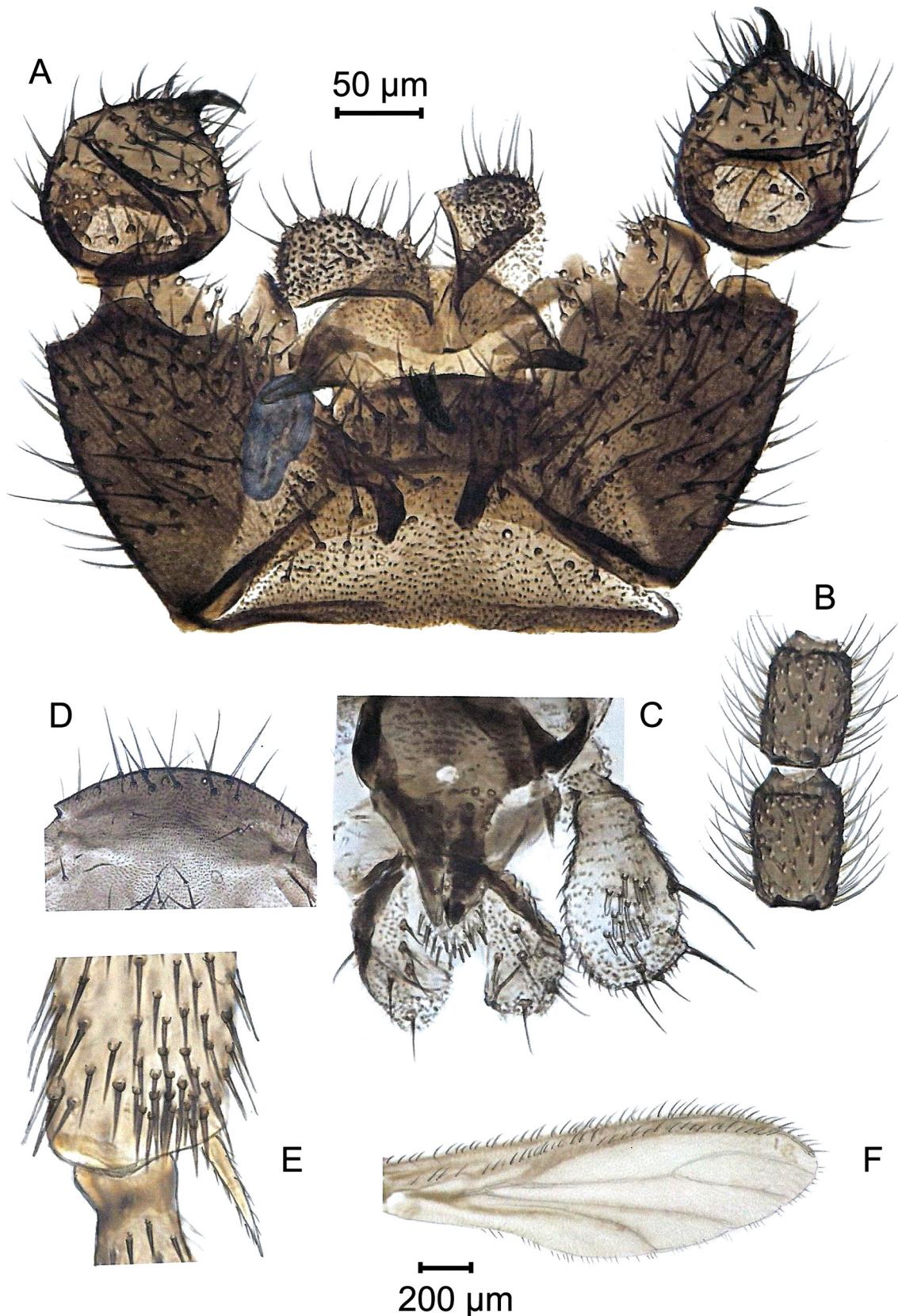
***Euricrium* Enderlein, 1911**

Type species: *Euricrium ruebsameni* Enderlein, 1911 [Enderlein (1911): 142–143, fig. 10].

Common synonyms: *Zygomma* Enderlein, 1911; *Mapiria* Edwards, 1934.

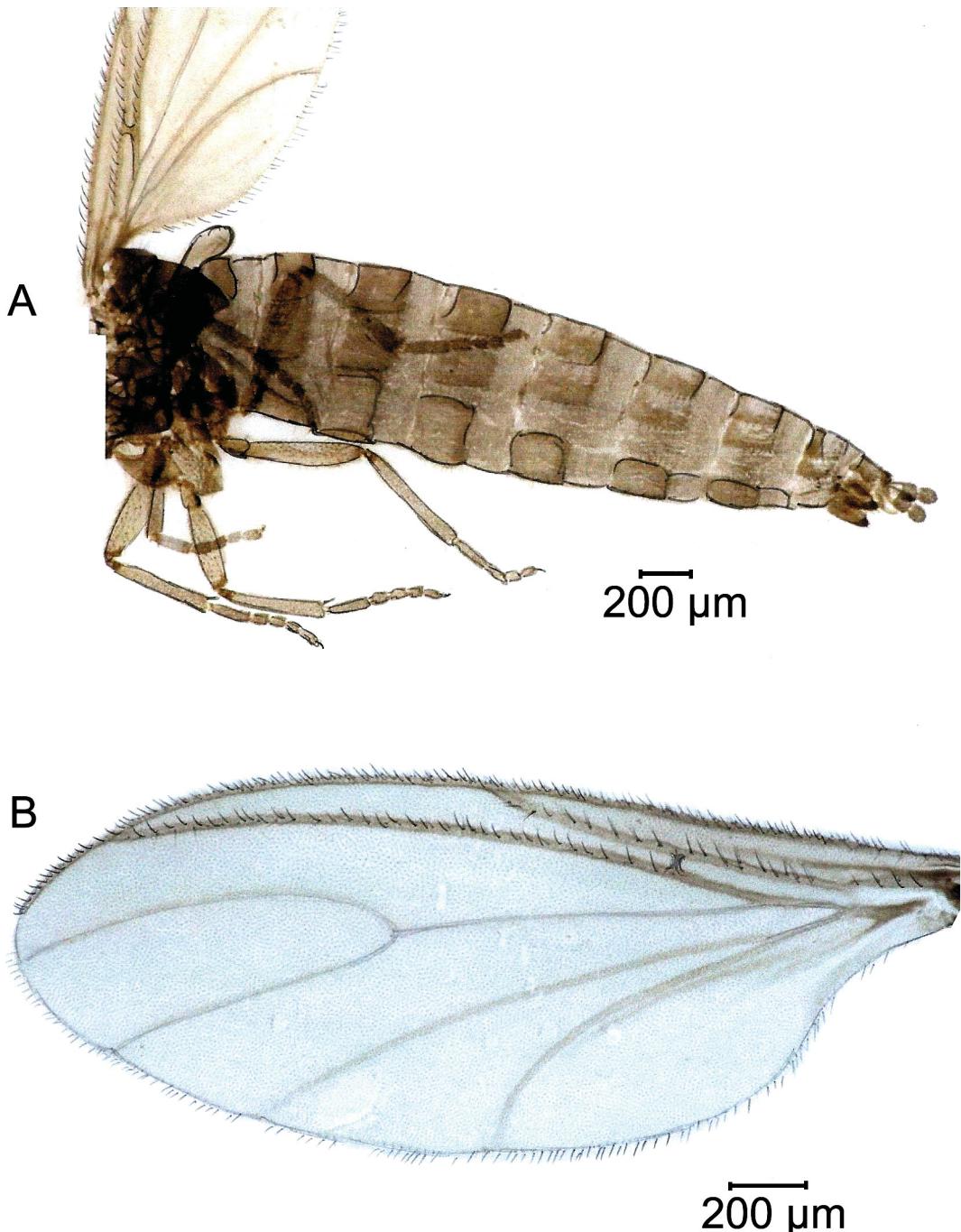
Literature: Edwards (1934): 369, 359, fig. 2; Menzel & Mohrig (2000): 721; Mohrig *et al.* (2013): 217–218; Mohrig & Menzel (2014): 143–153.

**Remarks.** The complicated search for the actual name of the genus was finalised by the revision of South American genera by Mohrig & Menzel (2014). Most of the species are characterized by the depigmentation of the last 2–3 flagellomeres in one or both sexes. The head is in some species distinctly higher than long (prolonged mouth



**FIGURE 16.** *Cratyna (Peyerimhoffia) subvagabunda* sp. n. A. Hypopygium; B. Flagellomeres 4–5; C. Mouthparts and palpus; D. Scutellum; E. Tibial organ; F. Brachypterous wing of male.

parts), the scutum has very short and sparse hairs,  $M_1$  is generally arched by differing degrees (M-fork in some species vase-like), the posterior wing veins are sometimes with macrotrichia, the membrane between sternites and tergites is mostly darkly pigmented, the fore tibia has a wide *Bradyzia*-like comb, the claws have fine teeth and the gonostylus has an apical tooth and a different number of spines at the base of the tooth or on the inner side of the gonostylus. The genus is known from Central and South America. The report from Australia is within the Sciaridae the first hint of a faunistic exchange through the Gondwanan Bridge and the existence of sister groups in the continents of the southern hemisphere.



**FIGURE 17.** *Cratyna (Peyerimhoffia) subvagabunda* sp. n. (female). A. Abdomen; B. Wing.

## Subgenus *Austroeuricrium* subg. n.

Type species: *Euricrium (Austroeuricrium) australiensis* sp. n.

**Description.** Head round, eye bridge 3 facets wide. Antenna brown, 4th flagellomere with l/w index of 4.0, hairs dense, erect and longer than the diameter of the basal node; neck rather long, brownish. Palpus 3-segmented, basal segment with a few bristles and without a deepened sensory area. Thorax rather flat, katepisternum weakly directed backwards. Scutum with short and fine hairs, some lateral bristles longer; scutellum with 2 longer and 2 shorter marginal bristles; postpronotum bare. Wing brownish,  $R_s$  without ventral macrotrichia;  $M_1$  arched (M-fork vase-like),  $CuA_1$  strongly curved towards the posterior border of the wing; posterior wing veins with macrotrichia. Apex of fore tibia with a wide comb of bristles and several isolated bristles within the horseshoe-like border; spurs of middle and hind tibiae equal in size; claws without teeth. The membrane between tergites and sternites darkened; hypopygium basally widely closed; gonostylus pointed to the apex, with an apical tooth and several spines at the inner side. Tegmen large, rounded apically, with a field of fine teeth.

**Remarks.** The type species is very similar to South American species of *Euricrium* s. str. in respect to the shape of the gonostylus with an apical tooth, a vase-like M-fork, a strongly curved  $CuA_2$  to the hind border of the wing, pigmented membranes between the abdominal sternites and tergites as well as the depigmented last flagellomeres in females. The main differences are the shape of the tibial organ with an irregular comb of bristles within a horseshoe-like border (in all known South American species the tibial organ forms a wide comb as in *Bradyzia*, without any border) and toothless claws.

### *Euricrium (Austroeuricrium) australiensis* sp. n.

(Fig. 18 A–E; 19 A–C)

**Type locality:** Australia, Queensland, Lamington, Nat. Park.

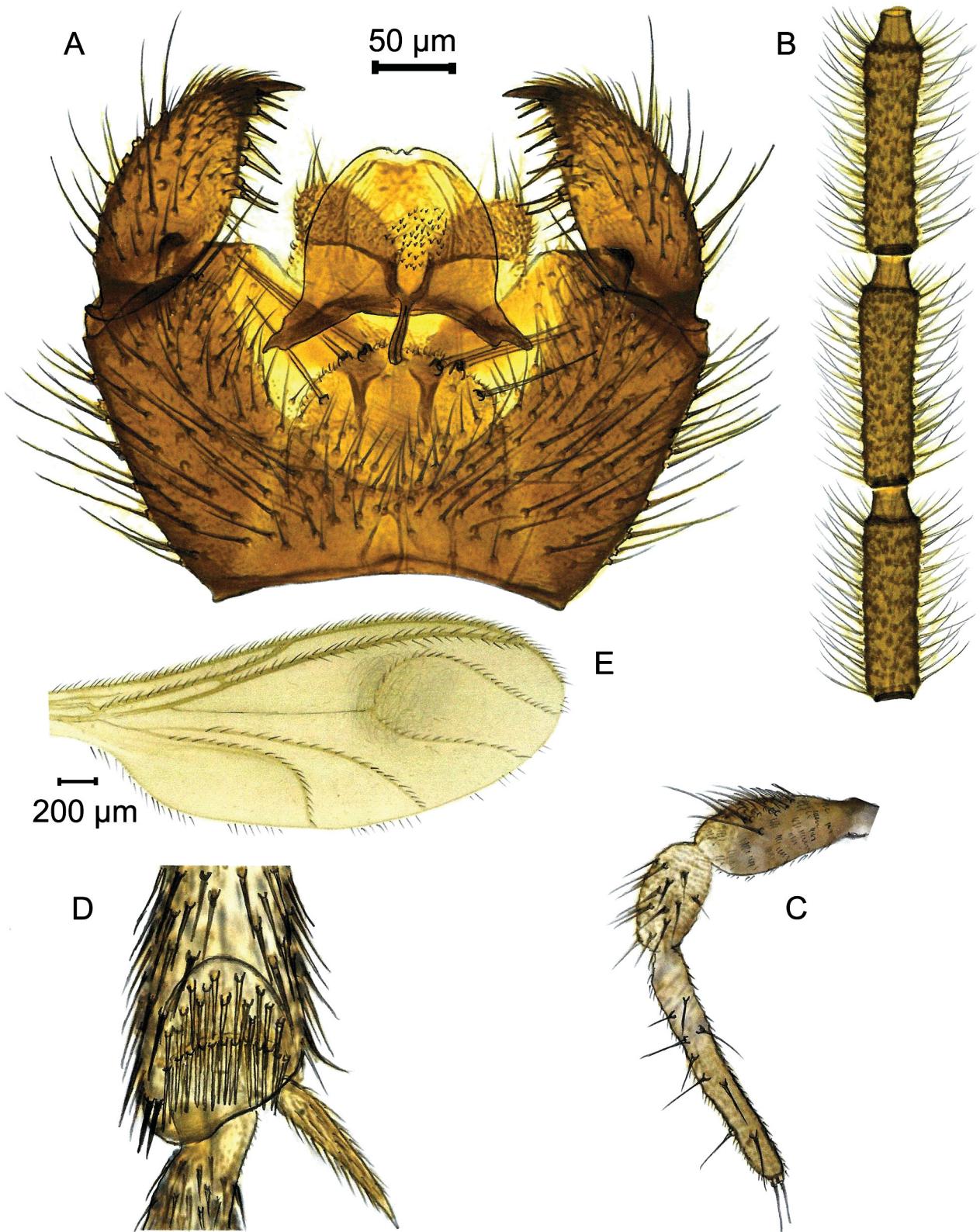
**Holotype:** Male, 11.viii.1965, leg. E.F. Reik, ASCT00053822 (ASCU).

**Paratypes:** 1 male, 1 female, same locality, same data; ASCT00053823 ( $\varphi$  in ASCU) & ASCT00053824 ( $\delta$  in PWMP); 1 male, 1977, NSW, Sherwood Creek, alongside creek, leg. A.J. Stocker, ASCT00053832 (PABM); 1 female, 8.viii.1997, Queensland, Mt. Lewis, 37 km WSW von Port Douglas,  $16^{\circ}35'$ ,  $145^{\circ}16'$ , Malaise trap, leg. J. Seymour (PWMP).

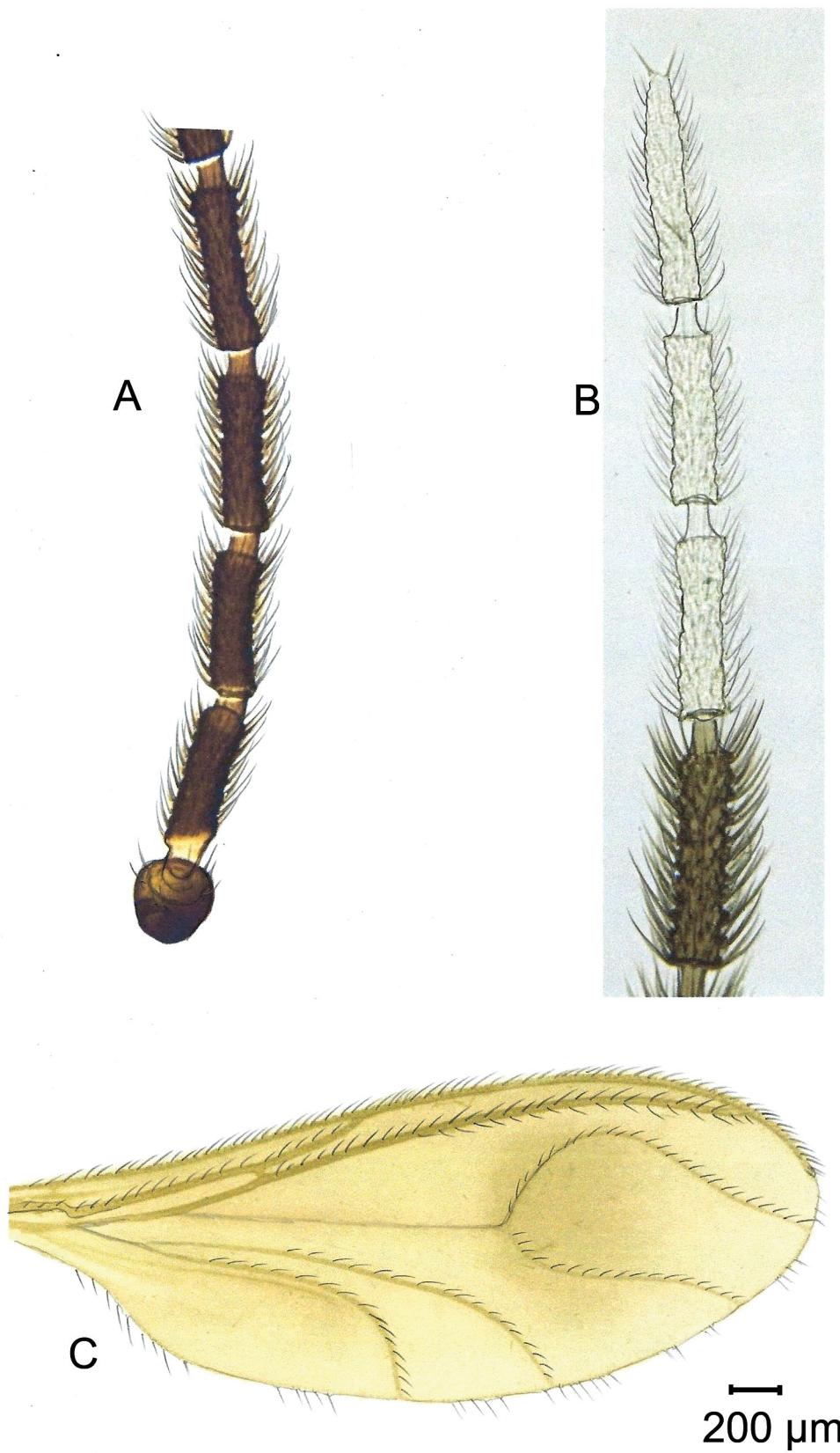
**Description.** **Male. Head.** Brown. Eye bridge 3 facets wide. Antenna brown, last segment somewhat paler; 4<sup>th</sup> flagellomere with l/w index of 4.0, hairs dense, erect and longer than the diameter of the basal node; neck rather long, brownish. Palpus pale, 3-segmented, basal segment with 3–4 bristles and without a deepened sensory area, 3<sup>rd</sup> segment long. **Thorax.** Brown, rather flat, katepisternum weakly backwardly directed. Scutum with short and fine hairs, some lateral bristles longer; scutellum with 2 longer and 2 shorter marginal bristles; postpronotum bare. Wing brownish, in the area of the M-fork with a darker patch;  $R_1 = 1/2 R$ ;  $R_s$  without ventral macrotrichia;  $C = 2/3 w$ ;  $y = x$ , without macrotrichia;  $M_1$  arched (M-fork vase-like),  $CuA_1$  strongly curved towards the posterior border of the wing; posterior wing veins with macrotrichia. Haltere brownish. Coxae and femora yellowish, tibiae and tarsi brownish (sometimes also the hind femur); apex of fore tibia with a wide comb of bristles and several isolated bristles within the horseshoe-like border; spurs of middle and hind tibiae equal in size, a little longer than the diameter of the apex; claws without teeth. **Abdomen.** Brown, with rather dense hairs, the membrane between tergites and sternites darkened. Hypopygium basally widely closed; gonocoxites at the inner ventral margin with rather long hairs; gonostylus pointed to the apex, with an apical tooth and 6–8 spines at the inner side nearly up to the base. Tegmen large, rounded apically, with a field of teeth. Aedeagus short. Body length: 3.5 mm.

**Comments.** The species is characterized by the vase-like M-fork, macrotrichia on posterior wing veins, horseshoe-like tibial organ on the fore tibia, claws without teeth, gonostylus with an apical tooth and a row of 6–8 spines on the inner side. The females have depigmented last flagellomeres. *Euricrium australiensis* differs from the Central and South American species mainly by the shape of the tibial organ and by having claws without teeth.

**Distribution.** Australia: New South Wales, Queensland.



**FIGURE 18.** *Euricrium (Austroeuricrium) australiensis* sp. n., male, A. Hypopygium; B. Flagellomeres 3–5; C. Palpus; D. Tibial organ. E. Wing.



**FIGURE 19.** *Euricrium (Austroeuricrium) australiensis* sp. n., female A. Pedicel and flagellomeres 1–4; B. Depigmented terminal antennal segments; C. Wing.

## *Phytosciara* Frey, 1942

Type species: *Sciara halterata* Lengersdorf, 1926 [Lengersdorf (1926): 250, fig. 12].

Literature: Frey (1942): 21, 27; Tuomikoski (1960): 103; Mohrig & Menzel 1994: 167–210; Menzel & Mohrig (2000): 433–451; Shin *et al.* (2013): 833.

### *Phytosciara (Dolichosciara) crocera* sp. n.

(Fig. 20 A–D)

**Type locality:** Australia, New South Wales, Minnamurra Falls.

**Holotype:** Male, 28.v.1963, leg. D.H. Colless, ASCT00049063 (ASCU).

**Paratypes:** 4 males, 1 female, same locality, same data (ASCT00054347, ASCT00049062 in PWMP; ASCT00049064 in ANIC; ASCT00049065 in PABM).

**Description.** Male. **Head.** Brown. Eye bridge 3–4 facets wide. Flagellomeres with rough surface; scape, pedicel and first flagellomere yellowish, the others brown; 4<sup>th</sup> flagellomere with l/w index of 2.5, hairs as long as the diameter of the basal node; neck rather long, bicoloured. Palpus pale, 3-segmented, basal segment with 7–8 bristles without a deepened sensory area, 3<sup>rd</sup> segment long. **Thorax.** Yellow. Scutum with three darker stripes, scutellum without distinct marginal bristles; pleural sclerites with a few indistinct darker patches. Wing brownish,  $R_1 = 3/4 R$ ;  $R_s$  in distal half with ventral macrotrichia; C nearly 1/2 w; y long, = 3 x, with few macrotrichia; posterior wing veins with macrotrichia. Haltere brownish. Coxae and femora yellow, tibiae and tarsi brownish; apex of fore tibia with a wide comb of bristles; spurs of middle and hind tibia equal in size, longer than the diameter of the apex; claws with strong teeth. **Abdomen.** Brownish, with rather dense hairs. Hypopygium with bare intergonocoxal space; gonocoxites at the inner ventral margin with rather long hairs, with 1 macroseta on the ventral apex; gonostylus prolonged, the apex with short and dense hairs, the inner side somewhat bulbous, with 6–8 long bristle-like spines. Tegmen large, longer than wide, rounded apically, with fine teeth. Aedeagus short. Body length: 5.0 mm.

**Comments.** The species is characterized by the yellow body colour, claws with strong teeth, one macroseta on the ventral apex of the gonocoxites and a bare intergonocoxal space. It differs from the other Australian species by having only one macroseta and the ventral base of the hypopygium is without a lobe or bristles.

**Distribution.** Australia: New South Wales.

## *Pseudolycoriella* Menzel & Mohrig, 1998

Type species: *Sciara bruckii* Winnertz, 1867 [Winnertz (1867): 38–39].

Literature: Menzel & Mohrig (1998): 367; Menzel & Mohrig (2000): 464–480; Vilkamaa *et al.* (2012c): 1–21; Mohrig (2013): 123–168.

### *Pseudolycoriella capillosa* Vilkamaa, Hippa & Mohrig, 2012

(Fig. 21 A–E)

*Pseudolycoriella capillosa* Vilkamaa, Hippa & Mohrig, 2012 [Vilkamaa *et al.* (2012c): 12–13, fig. 12 a–c].

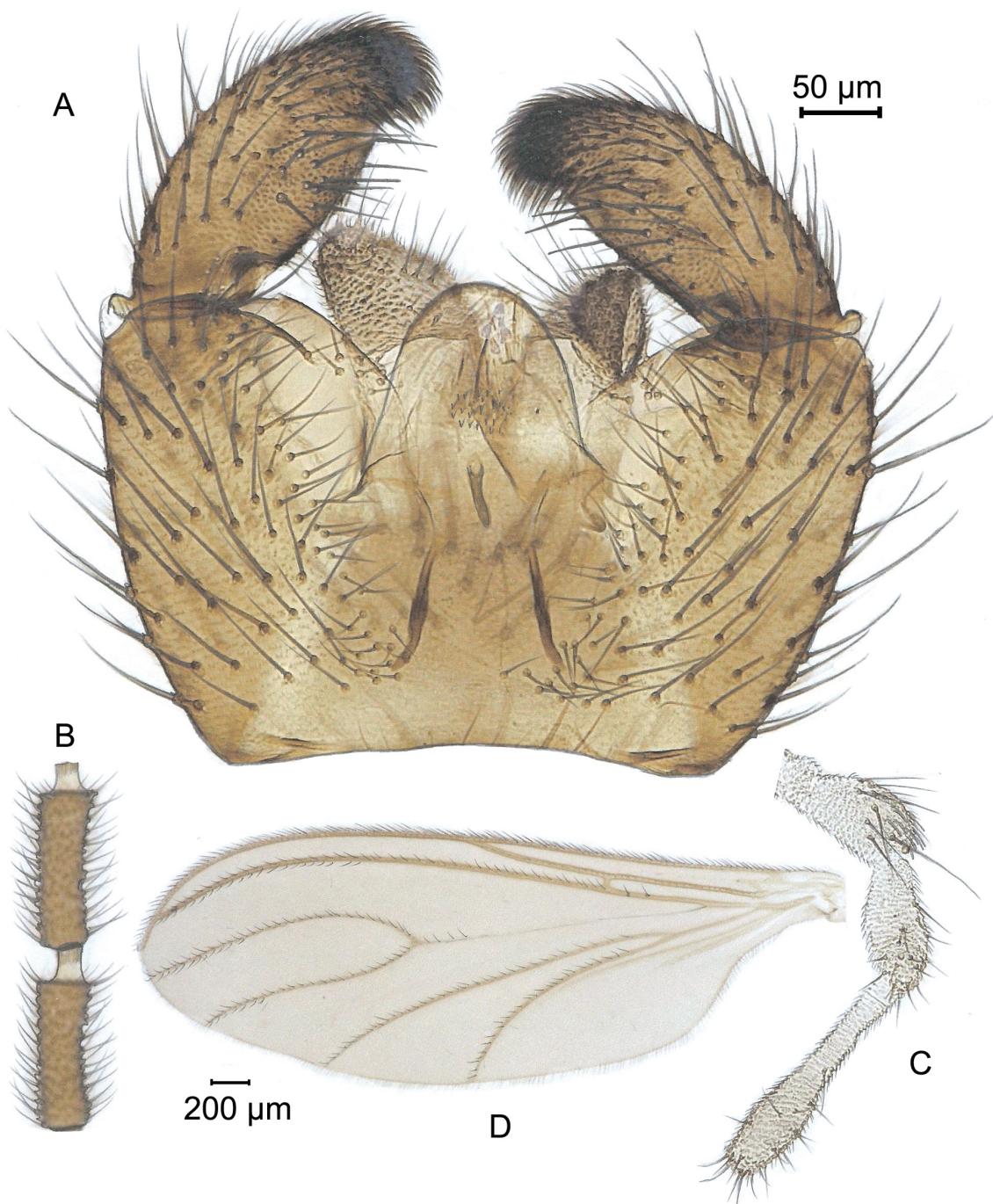
**Material.** 1 male, 7.vi.1978, Australia, New South Wales, Victoria Park, Lismore, rainforest, leg. B.J. Loudon, ASCT00053707 (ASCU).

**Additional description.** Male. **Head.** Dark brown. Eye bridge 3 facets wide. Antenna brown; 4<sup>th</sup> flagellomere with l/w index of 2.5, hairs erect and somewhat longer than the diameter of the basal node; neck rather long, brown. Palpus pale, 3-segmented, basal segment with 2–3 bristles, without a deepened sensory area. **Thorax.** Brown. Postpronotum bare. Wing brownish,  $R_1 = 1/2 R$ ;  $R_s$  without ventral macrotrichia; C = 2/3 w; y shorter than x, without macrotrichia; posterior wing veins without macrotrichia. Haltere brownish. Coxae and legs brown; apex of fore tibia with a wide comb-like row of bristles; spurs of middle and hind tibiae equal in size, slightly longer than

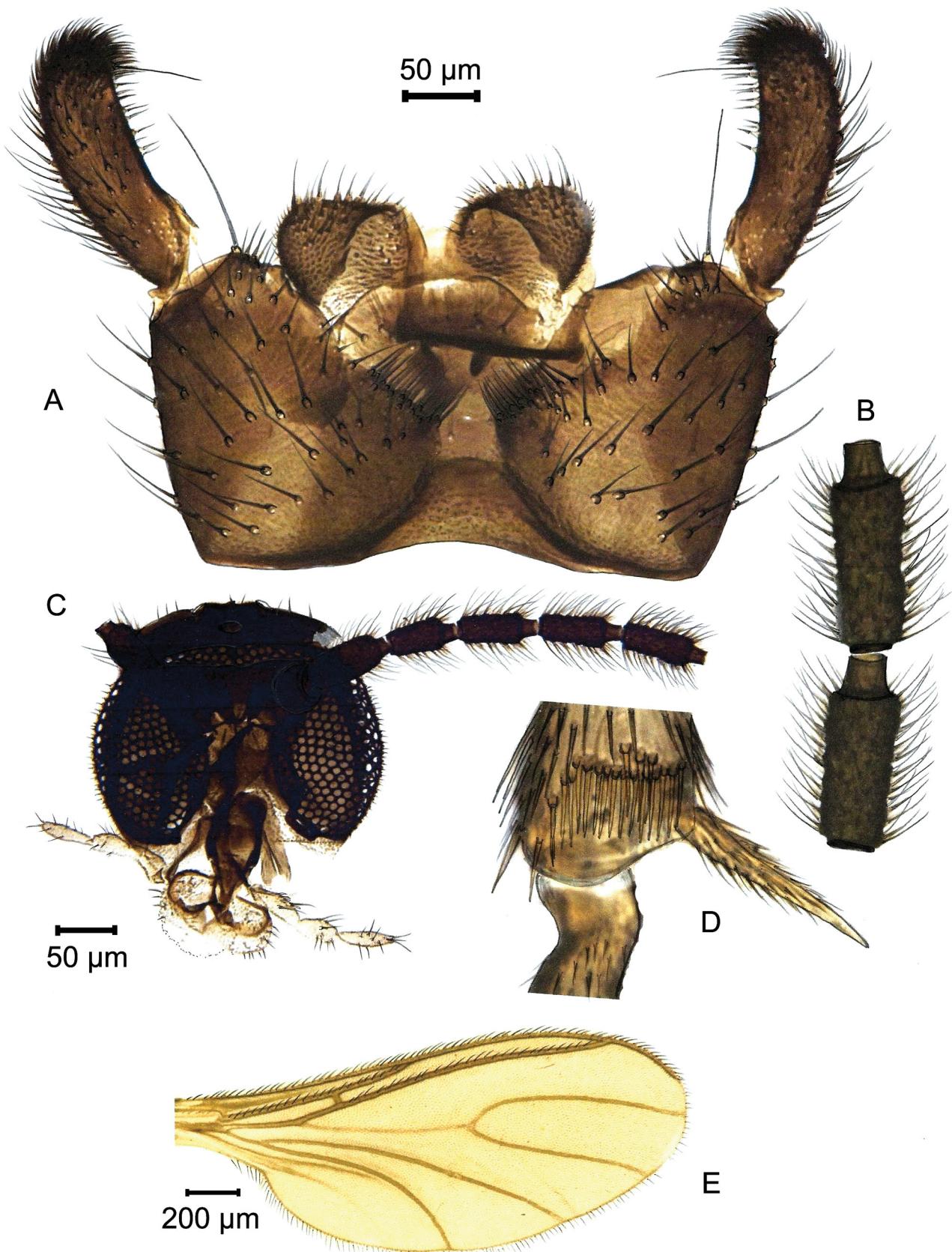
the diameter of the apex; claws without teeth. **Abdomen.** Brown. Gonocoxites with dense hairs at the basal third of the inner ventral margin; gonostylus prolonged and somewhat curved, the apex with short dense hairs and a long subapical whiplash hair (distinct spines are not visible between the hairs). Tegmen wider than long. Aedeagus short. Body length: 3.0 mm.

**Comments.** The species is characterized by having a prolonged and slightly curved gonostylus, with dense hairs at the apex, no visible spines among the hairs, a long subapical whiplash hair and dense hairs at the basal third of the ventral inner side of the gonocoxites.

**Distribution.** Australia: New South Wales; New Caledonia.



**FIGURE 20.** *Phytosciara crocera* sp. n. A. Hypopygium; B. Flagellomeres 4–5; C. Palpus; D. Wing.



**FIGURE 21.** *Pseudolycoriella capillosa* Vilkamaa, Hippa & Mohrig. A. Hypopygium; B. Flagellomeres 4–5; C. Head with palpi and basal segments of flagellomeres; D. Tibial organ; E. Wing.

***Pseudolycoriella latostylata* sp. n.**

(Fig. 22 A–E)

**Type locality:** Australia, New South Wales, Condobolin.

**Holotype:** Male, 13.vii.1978, from soil, leg. A. Westcott, ASCT00053674 (ASCU).

**Paratypes:** 1 male, 13.vii.1978, Derriwong (near Condobolin), leg. B. Read, ASCT00053800 (PWMP); 1 male, 14.xii.1978, New South Wales, Jerilderie, caught by net, ASCT00054274 (PABM); 3 males, 20.iii.1981, Wingham Brush, Near Taree, leg. B.J. Loudon, ASCT00054305 (PABM) / ASCT00054307 (ASCU) / ASCT00054303 (PWMP); 1 male, 25.x.1979, New South Wales, Jerilderie, rotating trap, leg. unknown, ASCT00053577 (PWMP).

**Description.** Male. **Head.** Dark brown. Eye bridge 3 facets wide. Antenna brown; 4<sup>th</sup> flagellomere with l/w index of 2.2, hairs erect, as long as the diameter of the basal node; neck brown. Palpus brownish, 3-segmented, basal segment with 4–5 bristles, without a deepened sensory area. **Thorax.** Brown. Scutum with whitish hairs, some lateral and prescutellar bristles longer. Postpronotum bare. Wing brownish,  $R_1 = 1/2 R$ ;  $R_s$  without ventral macrotrichia;  $C = 2/3 w$ ;  $y = x$ , without macrotrichia; posterior wing veins without macrotrichia. Haltere brownish. Coxae and legs brown; apex of fore tibia with a wide, slightly arched comb-like row of bristles; spurs of middle and hind tibia equal in size, slightly longer than the diameter of the apex; claws without teeth. **Abdomen.** Brown, with fine and sparse whitish hairs. Gonocoxites with dense hairs at the basal third of the inner ventral margin; gonostylus rather short and compact, the apex widely rounded, with short and dense hairs and a long subapical whiplash hair (distinct spines are not visible between the hairs). Tegmen deformed. Body length: 3.5 mm.

**Comments.** This large and dark species is characterized by the whitish body hair, dense hairs at the basal third of the ventral inner side of the gonocoxites, a strong gonostylus with dense hairs at the apex, a long subapical whiplash hair and no spines among the hairs at the apex. It is similar to *Psl. capillosa* Vilkamaa, Hippa & Mohrig. It differs by having longer flagellomeres, whitish body hairs, a shorter and more robust gonostylus, different shape of the tibial organ and a longer y.

**Distribution.** Australia: New South Wales.

***Pseudolycoriella rubroalata* sp. n.**

(Fig. 23 A–D)

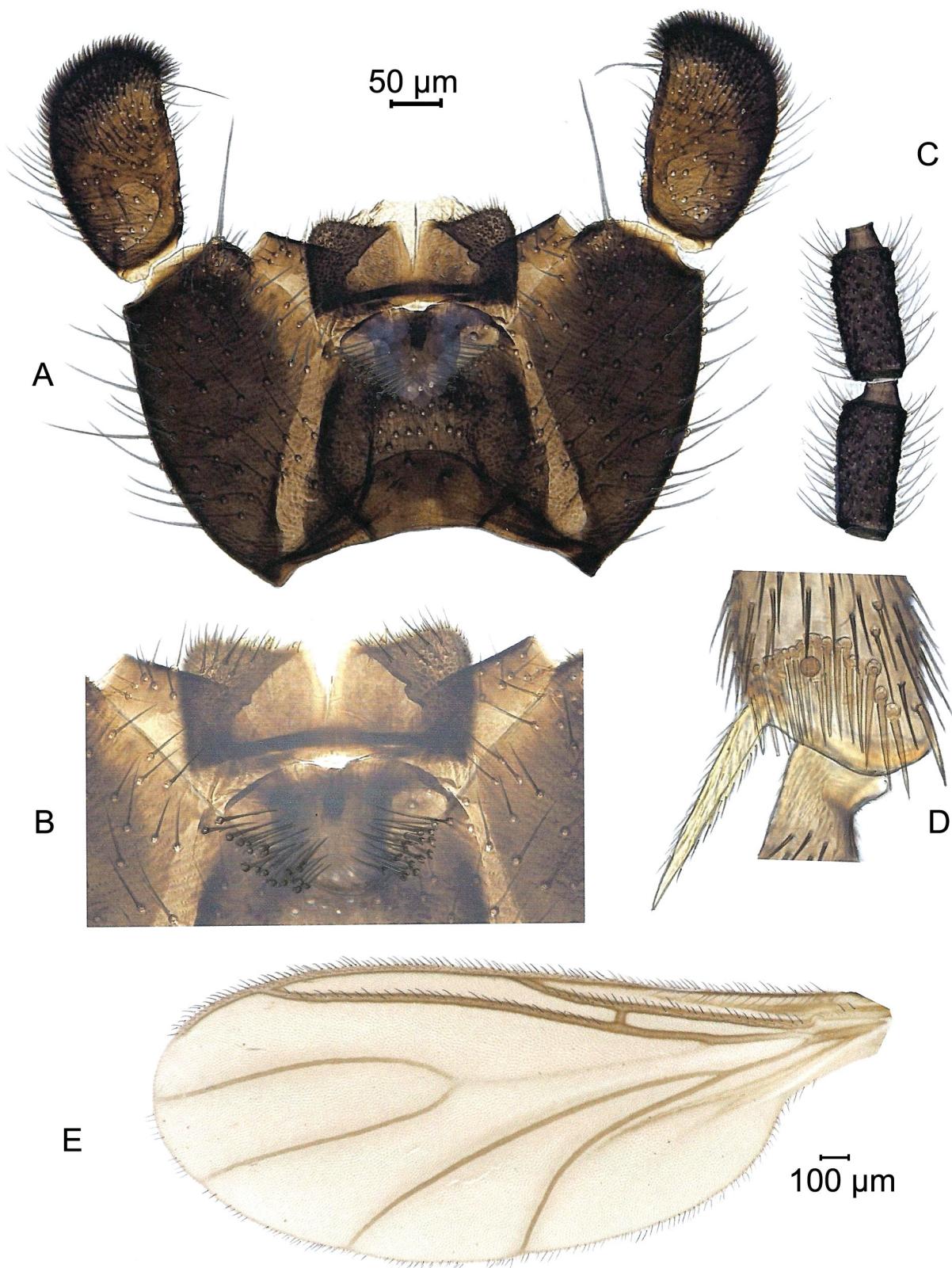
**Type locality:** Australia, New South Wales, Windsor.

**Holotype:** Male, 11.vii.1978, caught by sweep net, leg. D. Kent, ASCT00053801, (ASCU).

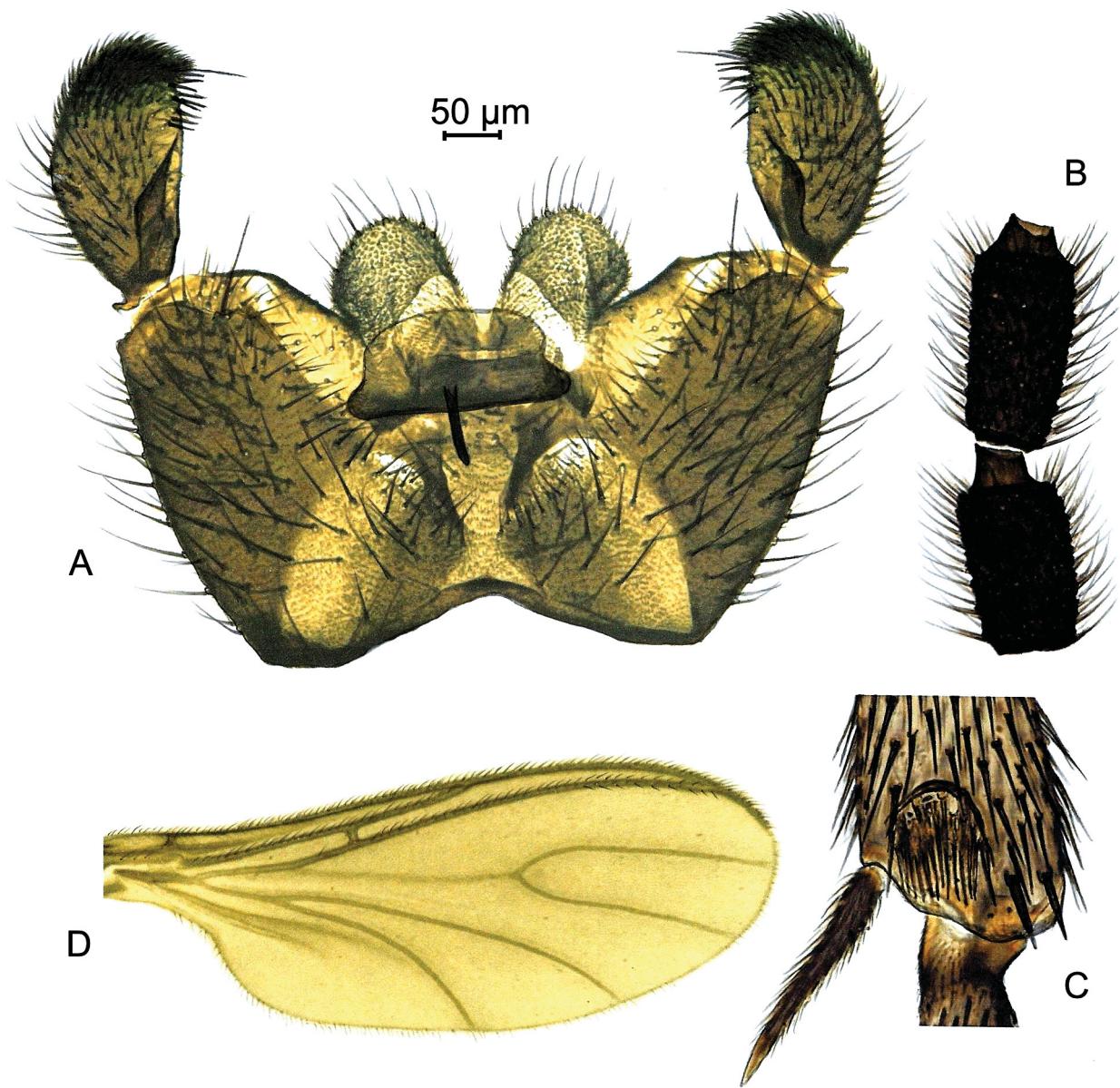
**Description.** Male. **Head.** Dark brown. Eye bridge 3 facets wide. Antenna brown; 4<sup>th</sup> flagellomere with a l/w index of 2.0, hairs erect, as long as the diameter of the basal node; neck brown. Palpus brownish, 3-segmented, basal segment with 4–5 bristles, without a deepened sensory area. **Thorax.** Brown. Scutum with dark hairs, some lateral and prescutellar bristles longer; scutellum with a few longer marginal bristles. Postpronotum bare. Wing brownish,  $R_1 = 3/4 R$ ;  $R_s$  with ventral macrotrichia in the distal third; C longer than 1/2 w; y shorter than x, without macrotrichia; posterior wing veins without macrotrichia. Haltere brownish. Coxae and legs brown; apex of fore tibia with a dense patch of bristles and a horseshoe-like border; spurs of middle and hind tibia equal in size, longer than the diameter of the apex; claws without teeth. **Abdomen.** Brown, with brown hairs. Gonocoxite with rather short hairs at the inner ventral margin; gonostylus short and compact, the apex widely rounded, with short and dense hairs, a long subapical whiplash hair and 8–10 short, fine and bristle-like spines below on the distal third of the inner side. Tegmen wider than long. Aedeagus rather short. Body length: 3.5 mm.

**Comments.** This large and dark species is characterized by the compact gonostylus with dense hairs at the apex, 8–10 fine spines below the whiplash hair and a bristle patch with a horseshoe-like border at the apex of the fore tibia.

**Distribution.** Australia: New South Wales.



**FIGURE 22.** *Pseudolycoriella latostylata* sp. n. A. Hypopygium; B. Ventral base of hypopygium; C. Flagellomeres 4–5; D. Tibial organ; E. Wing.



**FIGURE 23.** *Pseudolycoriella rubroalata* sp. n. A. Hypopygium; B. Flagellomeres 4–5; C. Tibial organ; D. Wing.

#### *Scatopsciara* Edwards, 1927

*Sciara (Scatopsciara)* Edwards, 1927 [Edwards in Tonnoir & Edwards (1927): 798].

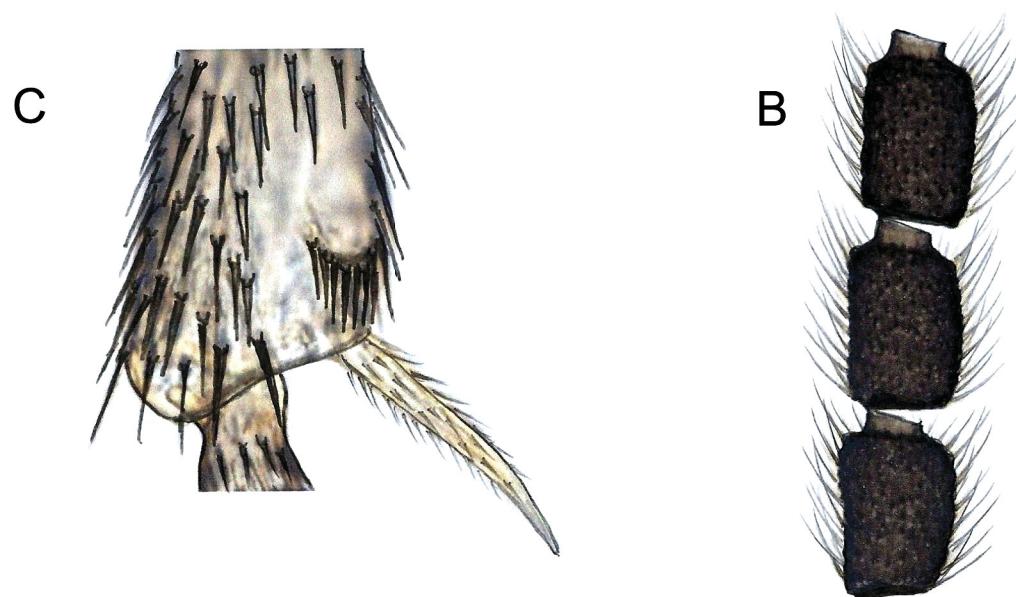
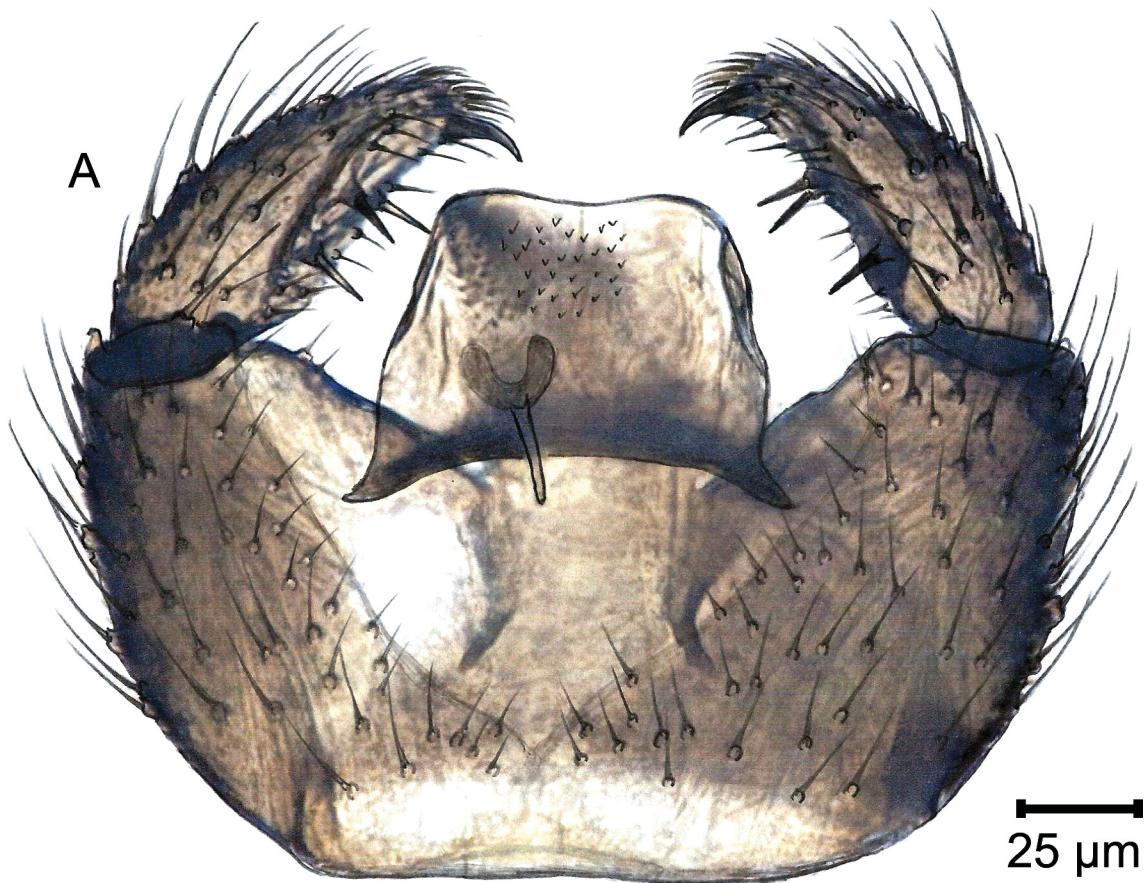
Type species: *Sciara quinquelleata* Macquart, 1834 [= *Scatopsciara vitripennis* (Meigen, 1818)].

Literature: Tuomikoski 1960: 150–156; Menzel & Mohrig (2000): 480–508; Mohrig (2004): 166–168; Vilkamaa *et al.* (2012d): 67–74.

#### *Scatopsciara nigrothoracica* sp. n. (Fig. 24 A–C)

**Type locality:** Australia, Victoria, Twin River Drive, South Morang.

**Holotype:** Male, 18.i.2015, yellow trap in vegetable garden, leg. A. Broadley, #74B (ANIC).



**FIGURE 24.** *Scatopsciara nigrothoracica* sp. n. A. Hypopygium; B. Flagellomeres 3–5; C. Tibial organ.

**Description.** Male. **Head:** Dark brown. Eye bridge 3–4 facets wide. Antenna brown; 4<sup>th</sup> flagellomere with l/w index of 1.5, with whitish hairs, somewhat shorter than the diameter of the basal node; neck brown. Palpus brownish, 3-segmented, basal segment with 1 bristle, without a deepened sensory area. **Thorax.** Brown. Scutum with dark hairs, some lateral and prescutellar bristles longer; scutellum with 2 longer marginal bristles. Postpronotum bare. Wing pale, R<sub>1</sub> short, somewhat longer than 1/2 R; R<sub>5</sub> without ventral macrotrichia; C shorter than 1/2 w; y shorter than x, without macrotrichia; posterior wing veins without macrotrichia. Haltere brown. Coxa and legs brown; apex of fore tibia with a rather wide comb-like row of bristles; spurs of middle and hind tibiae distinctly unequal in size; claws without teeth. **Abdomen.** Brown, with brown hairs. Hypopygium basally wide and v-shaped; gonocoxites with rather short and sparse hairs at the inner ventral margin; gonostylus pointed to the apex, the inner side flattened, with an apical tooth and 3 spines at the inner side, 2 as a cross pair near the middle, the third below the middle. Tegmen large, wider than long. Aedeagus rather short. Body length: 2.0 mm.

**Comments.** The species is characterized by the dark body colour and the pointed gonostylus with a flattened inner side and 3 short spines.

**Distribution.** Australia: Victoria.

## Acknowledgements

We are very thankful to Dr. Peter Gillespie and Birgit Loecker of the New South Wales Department of Primary Industries who allowed us to study this unique material, and Dr. Murray Fletcher for providing useful historical information. We also thank Dr. David Yeates, James Lumbers, Cate Lemann and colleagues at the Australian National Insect Collection, CSIRO, Canberra, Australia and Prof. Axel Kallies for collecting sciarid specimens in Australia. Thanks also to Bill Crowe, Andrew Tomkins and colleagues at the Department of Agriculture and Water Resources for supporting this study.

## Species list

**Bold** = valid name

*aspercera* Mohrig, 2016, *Bradysia*

*australiensis* sp. n., *Euricrium*

*brachypoda* (Shi & Huang, 2014), *Corynoptera* **comb. n.**

*capillosa* Vilkamaa, Hippa & Mohrig, 2012, *Pseudolycoriella*

*centidens* Vilkamaa, Hippa & Mohrig, 2012, *Bradysia*

*chloroantennata* sp. n., *Bradysia*

*conjuncta* (Skuse, 1890), *Bradysia*

*crocera* sp. n., *Phytosciara*

*diversicalcaria* Mohrig (2004), *Corynoptera*

*exsequialis* (Skuse, 1890), *Bradysia*

*fuscovirgata* sp. n., *Bradysia*

*gibbosa* Vilkamaa, Hippa & Mohrig, 2012, *Bradysia*

*hamata* (Shi & Huang, 2014), *Cratyna* **comb. n.**

*heterospinata* sp. n., *Austrosciara*

*kalliesi* sp. n., *Austrosciara*

*latostylata* sp. n., *Pseudolycoriella*

*longiprojecta* (Shi & Huang, 2014), *Corynoptera* **comb. n.**, *syn. n.* to *C. diversicalcaria* Mohrig (2004)

*loudoni* sp. n., *Bradysia*

*macrotrichata* sp. n., *Bradysia*

*multispinulata* sp. n., *Austrosciara*

*mutuata* Mohrig, 2016, *syn. n.* to *B. centidens* Vilkamaa, Hippa & Mohrig, 2012

*nigroantennata* sp. n., *Bradysia*

*nigrothoracica* sp. n., *Scatopsciara*  
*obesa* (Shi & Huang, 2014), *Cratyna* comb. n.  
*parareflexa* sp. n., *Bradysia*  
*pernitida* (Skuse, 1888), *Bradysia*  
*pictipes* (Skuse, 1888), *Bradysia*  
*rubrodolata* sp. n., *Pseudolycoriella*  
*shennongjiana* (Shi & Huang, 2014), *Corynoptera* comb. n.  
*sparsula* (Shi & Huang, 2014), *Corynoptera* comb. n.  
*stockerae* sp. n., *Austrosciara*  
*subvagabunda* sp. n., *Cratyna*  
*trichovenosa* sp. n., *Austrosciara*  
*yunnana* (Shi & Huang, 2014), *Corynoptera* comb. n.

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